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Presidential Address

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THE Canadian Public Health Association is happy to see its members gathered in such large numbers to attend the 1947 convention. All such meetings have a dual aim. On the one hand, there is the essentially scientific objective: the presentation and discussion of work representing the result of years of research and experimentation. Then there is the social side: personal contact with leaders in the academic and administrative branches of public health in our country. It is my earnest wish that these sessions may be both useful and enjoyable for all those attending them.

We extend a most hearty welcome to our distinguished guests from overseas and from the United States, and to the members of the State and Provincial Health Authorities of North America, who have honoured with their presence this, our thirty-fifth annual convention. In addition to their own meetings, they are taking an active part in our proceedings, adorning our program with the great names of the hour in public health. Their stay in our midst endows Quebec with an atmosphere recalling that created by the two meetings of the great allied leaders in the recent world war. Gentlemen, may your deliberations be most fruitful, and your stay among us long and pleasant.

During the tragic years of world-wide armed conflict, the public health men of Canada made their contribution to the war effort by redoubling their work, aimed at maintaining at its peak the health of the nation. We saw our ranks thinning out through the departure of physicians and nurses on active duty, and it became impossible to draw upon the usual sources to maintain our staffs at full strength. Those who were left took over the work of the colleagues who had gone, in addition to doing their own. Health officers,

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occupying high administrative posts, came back into the field of general practice, and we all worked shoulder-to-shoulder to meet the emergency.

Public health activities, far from slowing down, increased considerably. The population became more receptive to education. It was necessary to provide industrial employees with proper nutrition. Industrial-hygiene technicians were exhausted by endless hours on duty, without rest. Constant shifting of population increased the danger and possibility of infection; this made necessary an increase in prophylactic measures—immunization and vaccination. All the Provinces offered the services of their various technicians and their laboratory facilities to the Armed Forces, thus doubling the normal amount of work.

And, in addition, who among us has not served on certain committees, in the capacity of consultant or expert—committees formed to secure greater cohesion in the solution of problems created by the emergency? Liaison committees between health departments and industry, the Army, the Navy, the Air Force, and their social services, the Saint John's Ambulance Association, Civil Protection Committees, the Red Cross and the War Loans.

And at the very moment when our activities had reached their peak, came the cessation of hostilities, leaving us astonished and at the same time almost breathless from the magnitude of our effort.

We must now bring the picture into focus, in order to preserve what we have acquired during these years and to prepare for the years to come.

From the standpoint of public health, mobilization brought about the complete medical examination of over a million Canadians, who thus acquired a true picture of their physical condition; military training taught some 800,000 men and women the benefits of physical fitness and of a sound and properly balanced diet. In these fields, our soldiers, and as a consequence their families, have acquired a practical training which will have a favourable influence upon the health of the nation, if we are wise enough to follow up the educational work thus begun. Millions of Canadians, of both sexes, employed in war industries, have been under much closer medical supervision, and have had the benefit of advice from physicians, nurses and dietitians, whose services were retained by the larger companies.

Never before in our history has such a situation presented itself. Here, then, is a unique opportunity for our public health experts to prepare the future of the Canadian people, by working on receptive human material, of which a goodly proportion is already won over to the cause of better health.

Education is undoubtedly our starting-point. It is through publicity that the war effort, including heavy taxation, was sold to Canada: it is likewise by means of sound, intelligent propaganda that Canada will be sold on public health. Our population can be taught to buy and pay for public health, just as it was taught to buy and pay for Victory Bonds. It should be just as easy to sell immunization and vaccination for our own children as it was to sell the appeals of the Red Cross for distressed Europeans, provided we use the same care and common sense as we did in teaching the conservation of old rubber and the collection of waste paper. Gone for ever are the days when we chose to keep the "light under a bushel". The people of to-day want

to learn about health; it is therefore necessary to impart this vital knowledge by methods which will reach the masses, and through an efficient organization.

In North America, and more particularly in our own country, Canada, there remain practically no communities which are without some sort of public health service. But at times such services have little in common but the name, and they vary from an embryonic type, of little practical use, to a more satisfactory form of organization. The Provinces must assume the responsibilities vested in them by our Constitution, acknowledge the fact that public health is their first duty, establish a coherent plan of organization, and then energetically carry it into effect. But in practice, a public health service can only be as efficient as its staff; it follows, therefore, that this staff must be chosen with care, numerically adequate, competent and well-managed.

Until such time as public health administrators will be privileged to exercise a free choice of their technicians, we will have halting organizations, whose efficiency will reflect the fortuitous circumstances surrounding such appointments. Large corporations have long since solved this problem by creating a powerful personnel employment bureau, although undesirable or incompetent candidates were never thrust upon them.

Public health is no longer in its infancy and standards have been accepted which are followed by health organizations desirous of serving the public efficiently. The public health man who must act simultaneously as physician and sanitary inspector cannot be expected to fulfil either function satisfactorily; a public health nurse who has a population of 10,000 to 15,000 to look after, has no time for proper contact with the families in her care; she can only touch the surface without ever getting at the root of things. Our governments must see to it that health services are provided with sufficient staff.

It is hardly necessary to emphasize the necessity of having fully qualified personnel. Public health is primarily a matter of education, of teaching; it is plain common sense that we cannot teach that which we do not know. Hygiene, the Science of Health, so noble and so complex, may suffer serious loss of prestige when presented in awkward language, giving voice to hazy mental processes. Most people like common sense, and, when told the truth, they understand. Let us beware of empty phrases, of popular fads and fancies, of those half-truths frequently resorted to by poorly trained personnel. Very often, a well-educated layman could give lessons to certain persons who profess to be teachers of public health.

A sound administration will see to it that its employees are adequately remunerated. The medical officer who is in a position financially inferior to that of his confrères in private practice, the sanitary inspector who is crippled with debt, the public health nurse who can hardly make ends meet—none of these can do justice to their work. But it is not usually the administrative officer of the department who is responsible for this serious lacuna; the responsibility lies in higher quarters. This question is one of the nerve-centres of public health organizations of this country, as was demonstrated by our Association's investigation of salaries and qualifications of public health personnel. But we must not be turned away from our goal, after having

diagnosed the trouble. We must prescribe the specific remedy, and it is our earnest hope that the Association will carry on this work to a satisfactory conclusion.

The direction should be scientific as well as administrative and practical. Our leaders are not lacking in experience and knowledge, but they have no time to meditate, to plan and to judge. Let us take just one example, mental hygiene, the neglected child of public health. We are all agreed on the importance and the acuteness of the problem. Psychiatrists, psychologists and nurses trained for the treatment of mental cases have been assigned the task of combating this evil. Each case is studied individually, and such adjustments in the home are suggested as may tend to correct abnormalities observed. So far, so good; but it is not enough. Would it not be possible for a systematic study to give us a synthesis of the determining factors of mental deficiency, just as we have established the factors governing infections? The health officer who studies an endemic or epidemic disease has to examine as a whole the phenomenon of attack on the mass of the population; his unit of study is not the individual case but the entirety, the cases as a whole. Let us adopt the same formula for mental diseases as we have applied to infectious diseases, if we wish to get at the true causes of the trouble and take adequate prophylactic measures.

It is this concept of methodical and comprehensive study of a problem which was accepted by Chadwick, Chapin and Frost. May I quote Frost's philosophical definition of epidemiology: "It is the science of the phenomenon of attack of the mass by infectious or other diseases. Epidemiology at any given time is something more than the total of its established facts. It includes their orderly arrangement into chains of inference which extend more or less beyond the bounds of direct observation. Such of these chains, as are well and truly laid, guide investigation to the facts of the future."

Modern epidemiology is to-day a method of work, an instrument of the mind, designed to provide a general perspective of a totality, based on facts, judiciously observed and weighed. Such a methodology should be brought to bear upon all our problems. Our future depends not only upon our foresight and our imagination, but also upon the soundness of our logic and the sum of our energy.

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L'ASSOCIATION Canadienne de Santé Publique est heureuse de voir ses membres réunis si nombreux au congrès de 1947. Tout congrès a deux buts; le premier essentiellement scientifique: présentation et discussion de travaux qui sont le fruit d'années de recherche et d'expérience; et l'autre social: contact personnel avec les sommités du Monde universitaire et administratif en hygiène publique du pays. Je souhaite que les présentes assises soient, à tous, utiles et agréables.

Nous souhaitons la plus cordiale bienvenue à nos distingués visiteurs des Etats-Unis, et d'Europe, aux membres du "State and Provincial Health Authorities of North America", qui honorent notre trente-cinquième congrès annuel de leur présence; en plus de leurs propres réunions, ils prennent une part active à nos travaux, mettant à notre programme les grands noms de l'hygiène publique de l'heure actuelle. Leur séjour parmi nous donne à Québec un climat rappelant celui des deux Conférences Mondiales de Guerre. Messieurs, que vos discussions soient fructueuses et votre séjour parmi nous plaisant et prolongé!

Au cours de la tourmente effroyable qui a déferlé sur le monde, les hygiénistes du Canada ont fait leur effort de guerre en multipliant leurs activités pour maintenir la santé du peuple à son maximum. Nous avons vu nos rangs s'éclaircir par le départ de médecins et d'infirmières passant au Service Actif et il devint impossible de puiser à la source habituelle de matériel humain pour refaire nos cadres. Ceux qui restaient ont assumé les fonctions des collègues partis, en plus de leurs propres devoirs. Des hygiénistes de l'administration supérieure sont revenus dans le champ de la pratique et nous nous sommes serrés les coudes pour faire face à la situation.

Les activités en hygiène publique, loin de ralentir, ont augmenté considérablement; le peuple est devenu plus réceptif à l'éducation; il fallait assurer une bonne nutrition aux employés de l'industrie; les techniciens en hygiène industrielle ont été sur les dents et en devoir continuellement, sans repos; les mouvements importants de la population amenaient plus de dangers et de possibilités d'infection: il fallait donc accroître nos mesures de prophylaxie, d'immunisation et de vaccination. Toutes les provinces ont offert les services de leurs divers techniciens et leurs facilités de laboratoire aux Forces Armées, doublant ainsi le travail normal.

En plus, qui de nous n'a pas servi sur certains comités—à titre de consultant ou d'expert—comités destinés à assurer une meilleure cohésion pour résoudre les problèmes créés par une situation d'urgence? Comités de liaison entre les départements de santé et l'industrie, l'Armée, la Marine, l'Aviation et leurs services sociaux, l'Association Ambulancière Saint-Jean, les Comités de Protection Civile, la Croix Rouge et les Emprunts de Guerre.

Et au moment où nous étions au maximum de nos activités, est survenue la fin des hostilités, nous laissant à la fois émerveillés et presque hors d'haleine de l'effort fourni.

Il nous faut maintenant faire le point, pour conserver ce que nous avons acquis au cours de ces années et préparer notre futur.

Au point de vue santé publique, la mobilisation a réalisé l'examen médical complet de plus d'un million de Canadiens, qui ont ainsi fait le bilan de leur santé; l'entraînement militaire a enseigné à plus de 800,000 hommes et femmes les bienfaits d'une bonne aptitude physique et d'une alimentation saine et balancée. Dans ces domaines, les militaires et par contre-coup leurs familles ont reçu un entraînement pratique qui influencera favorablement la santé de la nation, si nous savons continuer l'éducation commencée. Des millions de Canadiens des deux sexes, employés dans les industries de guerre, ont été sous une surveillance médicale plus immédiate et ont profité des conseils des médecins, des infirmières et des diététistes, dont les grandes compagnies retenaient les services.

Une telle situation ne s'est jamais présentée dans notre histoire: voici donc une occasion unique pour les hygiénistes de préparer l'avenir du peuple canadien, en travaillant sur un matériel humain réceptif, dont une bonne partie est déjà gagnée à la cause de la santé.

Notre point de départ est certainement l'éducation. C'est par la publicité que l'on a vendu l'effort de guerre, y compris les taxes, au Canada: c'est également par une propagande de bon aloi, intelligente, qu'on lui vendra la santé publique; on peut faire acheter au peuple et lui faire payer pour la salubrité publique, comme il a acheté et payé ses Bons de la Victoire; on peut lui vendre les immunisations et vaccinations pour nos propres enfants aussi facilement qu'on lui a vendu les appels de la Croix Rouge pour les miséreux d'Europe, pourvu que nous y mettions autant de soin, et de sens commun, qu'on en a mis à nous apprendre à conserver le vieux caoutchouc et à recueillir les rebuts de papier. Les temps sont révolus où l'on croyait devoir tenir "la lumière sous le boisseau." Le peuple veut aujourd'hui connaître l'hygiène: il devient impératif de la lui enseigner par des méthodes qui atteignent la masse et par une bonne organisation.

En Amérique du Nord, et plus spécialement au Canada, notre pays, il n'existe pratiquement plus de localités qui ne soient desservies par un service de santé quelconque; mais, ces services n'ont parfois rien de commun que le nom et peuvent varier d'une forme amorphe et embryonnaire à une organisation presque satisfaisante. Les Provinces doivent assumer les responsabilités qui sont leurs de par notre constitution, reconnaître que la santé publique est leur premier devoir, établir un plan d'ensemble d'organisation et le mettre ensuite vigoureusement à exécution. Mais au point de vue pratique, un service de santé vaut ce que vaut son personnel: celui-ci doit donc être bien choisi, assez nombreux, qualifié et bien dirigé.

Aussi longtemps qu'on n'accordera pas aux administrateurs des services de santé publique le privilège de choisir librement leurs techniciens, nous aurons des organisations boîteuses, dont l'efficacité se mesurera aux hasards qui auront présidé aux nominations; les grandes compagnies ont depuis

longtemps réglé ce problème par un bureau puissant de sélection du personnel, et cependant on ne leur imposait jamais des candidats indésirables ou inaptes à leurs fonctions.

L'hygiène publique est sortie du stage de l'enfance et il y a aujourd'hui des standards reconnus auxquels adhèrent les organismes de santé qui tiennent à desservir convenablement une population. L'hygiéniste qui doit à la fois agir comme médecin et inspecteur sanitaire ne remplit convenablement aucune des deux fonctions; une infirmière-hygiéniste qui doit servir de 10,000 à 15,000 de population n'a pas le temps de prendre contact avec ses familles et ne fait qu'un travail de surface, effleurant tout, n'approfondissant rien. Il faut que l'Etat assure aux services de santé un personnel suffisant.

Il n'est pas besoin d'insister sur la nécessité d'avoir un personnel qualifié. L'hygiène publique est avant tout de l'éducation, de l'enseignement et il est de sens commun que l'on ne puisse enseigner ce que l'on ne sait pas. La science de l'hygiène, si belle et aussi si complexe, est dépréciée quand elle sort de bouches malhabiles et de cerveaux nébuleux. Le peuple aime le bon sens et quand nous lui disons la vérité il nous comprend: défions-nous des fadaïses, des engouements populaires, des demi-vérités où se complait le personnel non qualifié; l'élite du peuple pourrait souvent en remonter à certaines personnes qui font profession d'enseigner l'hygiène.

Une saine administration voit à ce que ses employés qualifiés soient raisonnablement payés: le médecin-hygiéniste en état d'infériorité pécuniaire vis-à-vis de ses confrères en clientèle, l'inspecteur sanitaire père de famille que guettent les dettes, l'infirmière-hygiéniste qui peut à peine rejoindre les deux bouts, ne donnent qu'un pauvre rendement. Mais, ce n'est généralement pas la direction administrative du service de santé qui est responsable de cette grave lacune: la responsabilité vient de plus haut. Cette question est l'un des points névralgiques des organisations de santé publique au pays, comme l'a démontré l'enquête de notre Association sur les salaires et qualifications du personnel. Mais il ne faut pas nous arrêter en si bon chemin, après avoir diagnostiqué le mal, il nous faut en venir au remède spécifique et nous formons le voeu que l'Association continue le travail commencé.

La direction ne doit pas seulement être administrative et matérielle, mais elle doit être scientifique. Nos dirigeants ne manquent pas de connaissances et de science, mais plutôt de temps pour méditer, réfléchir et juger. N'en prenons qu'un exemple, l'hygiène mentale, l'enfant négligée de l'hygiène publique. Tout le monde s'accorde à reconnaître l'importance et l'acuité du problème. On a assigné à la tâche des psychiatres, des psychologues et des infirmières entraînées dans le traitement des maladies mentales. Chaque cas est étudié individuellement et l'on essaie de faire les rajustements qui s'imposent dans le milieu familial pour obvier aux anomalies observées. Jusque là c'est bien, mais ce n'est pas suffisant. Pourquoi une étude ordonnée ne nous ferait-elle pas une synthèse des facteurs déterminant ces déficiences mentales, de la même façon que nous avons établi les facteurs gouvernant les infections. L'hygiéniste qui étudie une endémie ou une épidémie prend une conception globale du phénomène d'atteinte massive de la population; son unité d'étude n'est pas le cas, mais l'agglomération, l'ensemble des cas. Ac-

cepons la même formule pour les maladies mentales que pour les maladies infectieuses, si nous voulons remonter aux vraies causes du problème et prendre des mesures prophylactiques adéquates.

C'est ce concept d'une étude méthodique et globale d'un problème qu'avaient Chadwick, Chapin et Frost et je cite la philosophie de ce dernier sur l'épidémiologie: "C'est la science, disait-il, du phénomène d'atteinte massive de la population par les maladies, infectieuses ou autres. Elle est, en toute circonstance, quelque chose de plus que le total de ses faits établis. Elle inclue leur arrangement ordonné par des chaînes d'inférence qui s'étendent, plus ou moins, au-delà des limites de l'observation directe. Certaines de ces chaînes, telles qu'elles sont, guident sûrement et véritablement vers les faits du futur."

L'épidémiologie moderne est aujourd'hui une méthode de travail, un instrument de l'esprit pour lui donner une vue d'ensemble d'une totalité, basée sur des faits judicieusement observés et pesés. Appliquons une telle méthodologie à tous nos problèmes: c'est de notre raisonnement et de notre énergie, en même temps que de notre vision que dépend notre avenir.

State of Health of the People of Canada in 1945

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AN accurate measurement of the state of health of the people of Canada is not possible. It would be necessary to know the number of individuals periodically suffering from a "disorder" though seemingly well, in addition to those with frank clinical disease, in order to measure how many maintain varying degrees of "healthiness" during the year.

It is a curious fact that medical officers of health and health departments know little about the healthy. This largely results from placing first emphasis on those already diseased. Statistically also it is much easier because health is not a "reportable" condition. Since "disorder" and "disease" often have their beginnings years before frank clinical conditions appear—one thinks here of cancer—one must urge insistently further studies on the apparently healthy. Periodic health examinations and revisions of our knowledge of the normal ranges or standards of health are necessary parts of such studies. This, by the way, is not chiefly to provide the writers with currently unobtainable information about the healthy!

Morbidity and mortality statistics are not a sufficient index to the health of a nation—even if such statistics were complete. Since they are not complete, they may not be even a good guide to "ill-health". For example, there are no Dominion morbidity statistics on rheumatism, but this disease in the United States is said to rank first in prevalence and second in disability—though only fourteenth as a cause of death from chronic illness.¹ The acute infectious diseases have importance—but now it is a relative one and there is a growing appreciation of a "shift of emphasis" in public health towards those "oceans of unrecorded morbidity", such as chronic illness and accidents, which are presently contributing so heavily to ill-health of populations. This shift of emphasis is occurring noticeably in those nations in which the steadily decreasing morbidity and mortality rates from infectious diseases have occurred.

However, one must work with the tools at hand and certain information derived from vital statistics and other sources serves annually to approach the subject of the "healthy"—be it even indirectly.

¹National Health Survey 1935-36, Preliminary Reports, Sickness and Medical Care Service, Bulletin 6.

We present, then, only the highlights of the Dominion's health picture, as revealed by official facts and figures.

GENERAL FACTORS

World War II, in its sixth year, passed from the stage of "open hostilities" to that state often described as an "uneasy peace".

Those factors due to the war (and their cumulative effects) continued to affect our population. Some of the detrimental effects may be mentioned, e.g. overcrowding, overwork, increased consumption of alcohol (the 1939-44 increase of civilian purchases of alcohol and tobacco rose by 24 per cent, while that of food rose only 13 per cent.)² Of those factors implemental to health, the increase in employment and in individual purchasing power undoubtedly resulted in a higher standard of living, and the difficulties in obtaining automobiles and gasoline may have saved many lives and much injury.

In addition to the above, in 1945, Canada was faced with the urgent necessity to find living accommodation for thousands of returning servicemen soon to be demobilized. Serious concern by some health authorities was expressed regarding a large-scale importation by returning troops of "exotic" diseases or epidemic conditions uncommon in Canada, as well as those diseases we already have, that we do not want more of! However, those fears have not been borne out by statistics—even though about 185,000 personnel of the Canadian Army alone, returned to Canada during 1945.

POPULATION

The estimated population of Canada for 1945, given in Table II, represents an estimated increase of over a million persons in the past decade. The population increased 18.1 per cent from 1921 to 1931, 10.9 per cent from 1931 to 1941, and there was an estimated 5 per cent increase from 1941 to 1945.

TABLE I
RATE OF NATURAL INCREASE PER 1,000 POPULATION

		Canada	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Average	1921-25.....	16.2	10.1	10.8	15.4	21.9	12.3	18.1	20.2	17.7	9.8
"	1926-30.....	13.0	8.7	9.0	13.2	17.0	9.8	13.4	17.5	15.8	6.8
"	1931-35.....	11.7	10.7	10.3	13.6	15.6	8.3	11.7	15.4	14.8	5.1
"	1936-40.....	10.7	10.4	10.7	13.7	14.2	7.2	10.3	13.4	13.1	5.7
"	1941-45.....	13.7	13.3	14.6	17.2	18.5	9.7	12.6	14.0	15.7	9.4
Annual	1943.....	14.0	13.7	14.5	17.5	18.5	10.1	12.9	14.0	16.3	9.8
"	1944.....	14.1	14.9	15.3	18.0	19.3	9.7	12.7	13.8	16.0	10.0
"	1945.....	14.5	14.8	15.9	18.9	19.9	9.9	13.2	14.8	16.2	9.6

Fifty-four per cent of the population in 1941 was living in urban communities, an increase of 5 per cent over 1921. The great increase of employment in the larger cities during the war years has meant a movement of people from country to city, even since 1941.

Ours is still a young nation in 1945. Table II shows an estimate of more than one in three of our population under twenty years of age (37 per cent) and nearly 70 per cent under 40.

²Economic Background to Health During the War. Canad. J. Pub. Health, 1947, 38: 67.

TABLE II
CANADA 1945
POPULATION BY SEX FOR CERTAIN AGE GROUPS

Age Group	Census Population Per Cent Distribution		*Estimated Population		
	1931	1941	1945		
	Total	Total	Total	Male	Female
0-19	41.7	37.6	4,425,000	2,243,000	2,182,000
20-39	29.8	31.3	3,832,000	1,923,000	1,909,000
40-59	20.1	20.9	2,535,000	1,322,000	1,213,000
60-79	7.7	9.3	1,194,000	627,000	567,000
80 and over	0.7	0.9	116,000	54,000	62,000
Total	100.0	100.0	12,102,000	6,169,000	5,933,000

*Estimates made by Dominion Bureau of Statistics (Social Analysis Branch) are exclusive of the Yukon and Northwest Territories.

BIRTHS

It is of interest to note that at birth a Canadian boy now has approximately 65 years to live (based on an average expectancy of life of 64.9 years as estimated for 1945). For girls this expectancy would be 67 years. This is a gain of four years for boys and six years for girls in slightly over a decade.

TABLE III
BIRTH RATES PER 1,000 POPULATION FOR CANADA AND THE PROVINCES, 1941-45

	Canada	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
1941.....	22.2	21.8	23.9	26.6	26.9	19.0	20.2	20.6	21.9	18.4
1942.....	23.4	23.9	25.7	27.0	28.2	20.0	21.5	21.6	23.7	19.3
1943.....	24.0	23.9	25.1	28.0	28.7	20.6	22.5	22.1	24.5	20.8
1944.....	23.8	25.1	25.5	29.1	29.2	19.7	21.9	21.4	23.7	20.4
1945.....	23.9	24.5	25.0	29.3	29.3	19.7	22.1	22.4	24.1	19.9

In Canada in 1921 the birth rate was 29.4 per 1,000 population. It declined continually and steeply until 1937, when it was 20.0 per 1,000. Since then, following economic recovery and during the war of 1939-45, a sharp rise has taken place. As seen in Table III, the rate has increased in all the provinces in the period 1941-45, the greatest increase being in British Columbia where the rate was 13.4 in 1933 and 20.8 in 1943, with a slight decrease to 19.9 in 1945.

MARRIAGES

The marriage rate fell during the depression years and in 1933 was 6.0 per 1,000 population. The rate increased to 8.0 in 1937 and the increase continued during the early years of the recent war, when abnormally high rates were recorded. The rate was 10.9 in the years 1940 and 1942. For some of the provinces 1940 was the peak year and for others 1942. In 1943 and 1944 a decrease in the marriage rate occurred in all provinces but in 1945 in most

of the provinces the rate increased slightly. The divorce rate in Canada has steadily increased, however, and in 1945 it was approximately five times what it was twenty years ago.

TABLE IV
MARRIAGE RATES PER 1,000 POPULATION FOR CANADA AND THE PROVINCES, 1941-45

	Canada	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
1941.....	10.6	7.1	11.4	10.8	9.8	11.4	11.4	7.9	10.6	11.9
1942.....	10.9	8.6	11.6	10.6	10.0	11.7	11.6	8.5	11.6	12.4
1943.....	9.4	7.2	10.1	8.6	9.8	9.2	9.5	7.3	9.8	10.4
1944.....	8.5	7.1	9.7	8.3	9.1	7.9	8.6	7.0	8.9	9.0
1945.....	8.9	7.4	9.6	9.6	9.3	8.5	8.9	7.5	8.8	9.8

The temporary war increase in marriages, associated with a high level of employment and income, has tended to worsen the housing situation—which had never recovered from its depressed state in the inter-war years. This implies overcrowding of our population, in turn leading to increased facilities for the spread of infection—so true of tuberculosis!

DEATHS

The death rate for Canada was 11.5 per 1,000 population in 1921; 9.5 in 1934, and 9.3 in 1945. In the period 1934 to 1945 the rate fluctuated between 9.5 and 10.2 per 1,000. The low death rates in the Prairie Provinces are due, to a large extent, to the favourable age distribution of the population. The increases in the rates of these provinces in recent years are the result of the age distribution becoming less favourable. In 1937 the rate in Manitoba was 8.2, in Saskatchewan 6.5, and in Alberta 7.5 per 1,000.

TABLE V
DEATH RATES PER 1,000 POPULATION FOR CANADA AND THE PROVINCES, 1941-45

	Canada	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
1941.....	10.0	11.9	11.9	11.1	10.3	10.3	8.8	7.3	8.8	10.4
1942.....	9.7	10.7	10.8	10.9	10.0	10.1	8.8	7.4	7.8	10.2
1943.....	10.0	10.2	10.6	10.5	10.2	10.5	9.6	8.1	8.2	11.0
1944.....	9.7	10.2	10.2	11.1	9.9	10.0	9.2	7.6	7.7	10.4
1945.....	9.4	9.7	9.1	10.4	9.4	9.9	8.9	7.6	7.8	10.3

Age Specific Mortality

The death rates for the population as a whole and for all the age groups have declined. This is encouraging after nearly six years of war (but one

TABLE VI
AGE SPECIFIC MORTALITY RATES PER 1,000 POPULATION AND PROPORTION OF DEATHS IN CERTAIN AGE GROUPS IN CANADA

Age	Age Specific Rates			Per Cent of Total Deaths		
	1930-32	1940-42	1945	1930-32	1940-42	1945
Under 1	97.6	67.8	55.0	18.7	12.9	13.1
1-4	6.2	4.1	2.8	5.1	3.0	2.4
5-14	1.8	1.3	1.1	3.7	2.4	2.0
15-19	2.4	1.7	1.5	2.4	1.7	1.4
20-39	3.8	2.7	2.2	11.0	8.7	7.6
40-59	8.6	8.3	7.7	16.9	17.8	17.2
60-79	40.4	39.7	37.7	30.3	37.5	39.7
80 and over	169.4	167.8	161.6	11.9	16.0	16.6
Total	10.2	9.8	9.4	100.0	100.0	100.0

must remember this excludes about 42,000 deaths during the war, in the armed forces overseas). The decline has been most marked for the early years of life. It is least for the later years and as a result a larger proportion of deaths occur at the older ages.

It is of note that the proportion of older people increased from 8.4 in 1931 to 10.2 in 1941. As a result of this change in age distribution, the general death rate may be expected to rise somewhat in the future, even though most of the age specific rates continue to decline. Consequently all agencies having responsibility for the health and social welfare of the Canadian people will have to devote proportionately more time and funds to the study of the aged and their problems. Most of these problems will have their origin years before, and in their prevention lies a great future for "preventive" medicine.

Infant Mortality

The infant mortality rates in Canada were 102 per 1,000 live births in 1921; 85 in 1931; 60 in 1941 and 51 in 1945—the lowest yet recorded. However, one in 20 babies born alive still die before their first birthday.

TABLE VII

DEATH RATES OF CHILDREN UNDER ONE YEAR PER 1,000 LIVE BIRTHS, 1941-45

	Canada	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
1941.....	60	79	66	76	76	45	53	51	51	37
1942.....	54	49	58	77	70	40	51	44	38	36
1943.....	54	45	59	68	67	42	55	47	42	38
1944.....	55	45	54	77	68	43	49	47	46	40
1945.....	51	45	53	71	62	41	48	44	43	42

There is considerable variation in the rates in the different provinces as shown in Table VII but all of the provinces have had a striking and gratifying improvement since 1921. An illustration of this is the fact that approximately 14,000 infants survived in 1945 who would have died before their first birthday if the 1921 rate of mortality had prevailed.

Chief Causes of Infant Deaths

The causes of infant deaths which have shown the greatest decrease since 1926 in Canada are diarrhoea and enteritis, pneumonia, bronchitis and influenza, and the communicable diseases. Table VIII shows the chief causes of

TABLE VIII

CHIEF CAUSES OF INFANT DEATHS
CANADA, 1945

Cause of Death	Number of Deaths	Rate per 1,000 Live Births	Per cent of Total Infant Deaths
1. Premature Births	3,326	11.52	22.4
2. Pneumonia, Bronchitis and Influenza	2,626	9.10	17.7
3. Congenital Malformations	1,888	6.54	12.7
4. Diarrhoea and enteritis	1,625	5.63	11.0
All Causes	14,823	51.34	100.0

death of infants in 1945, and of these, congenital malformations is the only one which has not decreased—in fact it actually has increased slightly. At least one contributory factor has been discovered, i.e., german measles in the early months of pregnancy. Perhaps with further research into this third highest cause of infant deaths other factors will be unearthed which may prove to be preventable in nature.

Maternal Mortality

In 1945 we still lost 654 mothers from childbirth, and approximately a total of 8,000 mothers in the last ten years.

TABLE IX

DEATH RATES PER 1,000 LIVE BIRTHS FROM PUERPERAL CAUSES, CANADA, 1941-45

	Canada	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
1941.....	3.5	2.9	3.5	3.4	4.4	3.0	3.1	3.2	3.0	2.6
1942.....	3.0	4.7	2.6	4.6	3.3	2.6	2.6	3.3	2.3	2.7
1943.....	2.8	4.1	3.7	2.9	3.2	2.4	2.4	2.6	2.6	2.5
1944.....	2.7	5.2	2.1	3.2	3.1	2.5	3.1	2.3	1.6	2.6
1945.....	2.3	2.7	1.5	1.8	2.5	2.2	1.9	2.6	2.4	2.6

However, substantial reductions have been made in maternal mortality in Canada. The average rate per 1,000 live births for Canada in the period 1926-30 was 5.7. One of the provinces had a rate of 6.6 and two others had a rate slightly over six. But in 1945 the rate for Canada was only 2.3 and the highest rate in any province was 2.7, while one province had a rate of only 1.5 per 1,000 live births. In recent years, although the number of births has greatly increased, the number of mothers who have died from puerperal causes has been well below 1,000 per year.

Causes of Maternal Mortality

The causes of maternal mortality which have shown the greatest reduction are puerperal sepsis and the toxæmias. These were the chief causes of death in 1926. The rate, then, for puerperal sepsis was 1.86 per 1,000 live births and 1.49 for the toxæmias. In 1940 these rates were 1.13 and 0.96 respectively. Due to the revision of the classification of deaths, it is not possible to combine the causes in exactly the same groups in the period 1941 to 1945, but the rates for certain causes for the two years are shown in Table X.

TABLE X

FOUR CHIEF CAUSES OF MATERNAL MORTALITY
RATE PER 1,000 LIVE BIRTHS, CANADA, 1941 AND 1945

Int'l List No.	Causes of Death	1941	1945
147	Infection during childbirth and puerperium.....	0.92	0.62
143 & 146	Haemorrhage of Pregnancy and childbirth.....	0.61	0.47
144 & 148	Toxaemias of pregnancy and puerperium.....	0.84	0.44
140 & 141	Abortions.....	0.49	0.24
	All Causes.....	3.53	2.29

CHIEF CAUSES OF MORTALITY

Chief Causes of Death under 50 years of Age

A third (36,787 deaths) of the total deaths in Canada in 1945 were under 50 years of age. Almost half of these were under one year of age (i.e., the 14,823 babies who died before their first birthday as shown in Table VIII).

In the pre-school age group, of the four chief causes of deaths (bronchitis, pneumonia, accidental deaths, tuberculosis, diarrhoea and enteritis in that order), three were due to infections. However, accidental deaths—the second chief cause of death—accounted for one in five deaths. These were largely due to motor-vehicle accidents, burns and drownings.

In the school-age group 5-14 years, accidental deaths (620 deaths), now the chief cause for the group, accounted for 28 per cent of the total deaths, and tuberculosis accounted for 15 per cent. Diphtheria as fifth cause of death in school children accounted for one in 20 deaths.

In adolescence and adult life—ages 15-49—the chief causes were tuberculosis, accidental deaths, heart diseases and cancer, in that order.

Accidental Deaths and Tuberculosis

The important role of accidental deaths and tuberculosis in the ages 1-49 years is well shown in Table XI.

TABLE XI
CANADA, 1945
CERTAIN CHIEF CAUSES OF DEATH

Cause of Death	Age Groups and Position of Cause of Death				
	1-4	5-14	15-19	20-39	40-49
Tuberculosis	Third	Second	First	First	Fourth
Accidental	Second	First	Second	Second	Fifth
Influenza, Pneumonia and Bronchitis	First	Third	Fourth	Seventh	Seventh

Regarding accidental deaths, i.e. 6,855 for all ages, one notes that 50 per cent occurred under 40 years of age. Deaths are not a sufficient indication of the extent of the problem. For example, in 1945 there were also about 35,000 persons injured in transportation accidents alone, which were not fatal. No records are available of all the other non-fatal accidents—for example, on farms, in homes and in industries.

With regard to tuberculosis, the mortality rate has decreased from 87.7 per 100,000 in 1921 to 45.9 in 1945, the lowest rate yet recorded for Canada. However, the fact remains that 5,559 persons died from this infectious disease during the year and there were 14,328 cases reported in 1945.

TABLE XII
TUBERCULOSIS (ALL FORMS)
RECORDED MORBIDITY AND MORTALITY RATES PER 100,000 POPULATION,
CANADA, 1936-45

	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
Morbidity Rate.....	79.0	76.8	81.6	90.5	90.0	91.2	103.2	106.1	127.9	118.4
Mortality Rate.....	61.9	60.5	55.0	53.1	50.9	52.8	51.4	52.3	47.9	45.8

The reported cases as shown in Table XII show an increased rate of 39.4 per 100,000 in the decade ending with 1945. This increase is believed to be accounted for by better case-finding, especially since mass X-ray surveys were done in several provinces during those years.

It is estimated³ that the tuberculosis problem in a community concerns roughly 24 persons per annual death (i.e. 6 cases plus 18 contacts of these cases). This estimate if applied to Canada would indicate a "tuberculosis-load" of cases and contacts in our nation of nearly 135,000 persons, of which one-third would be patients! Even if part of this were true, the burden on hospital and public health authorities responsible for tuberculosis-control work in Canada appears obvious.

Tuberculosis has always been a good index to the general socio-economic state of the population. It follows, then, that better housing, better nutrition, slum clearance, etc., must receive attention at least equal to our mass case-finding surveys in future programs, if we expect to eradicate this disease.

Chief Causes of Death over 50 years of Age

Two-thirds of all deaths in Canada were of persons over 50 years of age. Over half (58 per cent) of these were from the cardiovascular-renal group of diseases. The deaths per 100,000 from this particular group of diseases have increased from 305 in 1935 to 398 in 1945, and now nine out of ten of these deaths are over 50 years of age, as shown in Table XIII.

TABLE XIII
FIVE LEADING CAUSES OF DEATH
AGE GROUP 50 YEARS AND OVER IN RELATION TO DEATHS AT ALL AGES
CANADA, 1945

CAUSE	No. of Deaths in Age Group 50 years and over	Per cent of Deaths in Age Group 50 years and over	Total Deaths at All Ages	Per cent of Deaths 50 years and over
Cardiovascular-renal disease	44,216	57.8	48,262	92
Cancer & other malignant tumours	12,225	16.0	14,439	85
Influenza, pneumonia & bronchitis	3,157	4.1	7,030	45
Accidents	2,936	3.8	6,855	43
Diabetes	2,155	2.8	2,417	89
Others	11,666		34,139	
Total Deaths from all Causes	76,355		113,142	

CAUSES OF MORBIDITY

Canadian illness during the year might be grouped as follows: reportable diseases, unreported diseases, disorders or conditions not recognized as disease.

There were no generalized Canadian surveys to expose the third group of conditions which are exemplified by many of the causes for army rejections, such as hernias, haemorrhoids, flat feet, etc. No statistics obviously are available for the second group of diseases, even though they may be important and disabling—for example, cases of diabetes, arthritis, and even cancer.

³Community Health Organization, 3rd ed., The Commonwealth Fund, 1939.

With the statistics available, one must, therefore, limit attention here to the reportable diseases in presenting the Canadian picture. This group is still relatively important, especially considering the epidemic potentialities.

CASES AND DEATHS OF NOTIFIABLE DISEASES

The number of cases of notifiable diseases reported in 1945 amounted to 173,692 as compared with 225,774 in 1944. The decrease in the total number of cases reported is largely due to decreases in measles, scarlet fever and influenza.

The reported incidence of notifiable diseases by provinces for the year is shown in Table XIV.

TABLE XIV
NUMBER OF CASES OF NOTIFIABLE DISEASES
REPORTED TO THE DOMINION BUREAU OF STATISTICS BY
PROVINCIAL HEALTH DEPARTMENTS DURING THE YEAR 1945

	Canada	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Venereal diseases	40,528	78	1,840	1,492	11,152	13,154	2,958	2,097	2,480	5,277
Chickenpox	31,647	42	789	37	6,313	12,491	2,446	1,677	3,147	4,705
Measles	26,978	5	169	189	5,676	8,713	509	1,225	1,415	9,077
Mumps	20,400	—	189	23	7,203	5,222	1,496	950	4,141	1,176
Tuberculosis	14,328	412	343	333	6,372	2,393	807	614	1,039	2,015
Whooping cough	12,192	4	527	234	7,363	2,309	376	164	692	523
Scarlet fever	11,982	41	326	662	3,772	3,684	775	333	1,348	1,041
Influenza (epidemic)	4,591	84	1,241	1	—	2,374	202	36	—	653
Rubella (1)	3,298	—	261	—	383	1,108	35	123	618	770
Diphtheria	2,786	19	223	166	1,678	253	283	74	54	36
Typhoid and paratyphoid	883	—	21	26	588	88	46	21	44	49
Dysentery (2)	547	—	—	—	186	46	23	—	—	292
Poliomyelitis	384	—	26	7	57	184	24	20	14	52
Undulant fever	288	—	1	1	139	84	13	10	13	27
Meningitis (meningococcal)	249	1	13	23	52	86	14	12	22	26
Encephalitis (infectious)	17	—	1	—	—	2	8	2	4	—
Smallpox	5	—	—	—	—	—	—	5	—	—

(1) Reporting not compulsory in the Provinces of New Brunswick and Manitoba.

(2) Not reportable in New Brunswick.

Of the ten chief causes of infectious diseases as noted in the above table, venereal diseases accounted for 23 per cent, while the remaining 9 diseases accounted for 74 per cent. The highlights of the reported incidence of these diseases are shown in Table XV and Table XVI.

TABLE XV
CASES OF VENEREAL DISEASES IN CANADA
AS REPORTED BY PROVINCIAL HEALTH DEPARTMENTS

	1944	1945
Syphilis.....	16,475	15,279
Gonorrhoea.....	22,282	25,237
Other.....	15	12
Total.....	38,772	40,528

TABLE XVI
RECORDED MORBIDITY AND MORTALITY RATES PER 100,000
YEAR 1945 AND MEDIAN 1934-44

Disease	Morbidity Rate		Mortality Rate	
	1945	Median 1934-44	1945	Median 1934-44
Chickenpox.....	261.5	242.5	0.1	0.3
Measles.....	222.9	403.5	0.8	2.0
Mumps.....	168.6	165.7	0.2	0.2
Tuberculosis.....	118.4	90.0	45.8	53.1
Whooping cough.....	100.7	157.7	3.9	4.8
Scarlet fever.....	99.0	151.8	0.7	1.5
Influenza.....	37.9	62.2	9.0	21.2
German measles.....	27.3	38.4	0.02	0.05
Diphtheria.....	23.0	24.9	2.2	2.4

The diseases which comprise the remaining 3 per cent of the reported cases are shown in Table XVII for the years 1944 and 1945.

TABLE XVII
REPORTED CASES OF CERTAIN DISEASES IN CANADA, 1944 AND 1945

Disease	1944	1945	Disease	1944	1945
Typhoid fever.....	1,203	772	Trachoma.....	20	18
Septic sore throat.....	660	734	Encephalitis (infectious).....	31	17
Jaundice (infectious).....	2	616	Malaria.....	38	14
Dysentery (all forms).....	520	547	Actinomycosis.....	8	5
Conjunctivitis (non gonorrhoeal).....	203	519	Smallpox.....	0	5
Poliomyelitis.....	722	384	Puerperal septicaemia.....	23	2
Vincent's angina.....	38	349	Tularaemia.....	7	1
Erysipelas.....	396	328	Leprosy.....	1	1
Undulant fever.....	226	288	Tick paralysis.....	1	1
Meningitis (meningococcal).....	399	249	Trichinosis.....	1	1
Paratyphoid fever.....	41	111	Botulism.....	6	-
			Rocky Mountain spotted fever.....	3	-

Increased Efficiency of Diphtheria Toxoid When Combined With Pertussis Vaccine

A Preliminary Note

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DURING the course of a study concerning the use and effectiveness of multiple antigens in immunization, some observations have been made when diphtheria toxoid and pertussis vaccine are combined for this purpose. These preliminary results appear to be worth-while reporting since many physicians are using such preparations at the present time and some doubt exists as to whether or not the presence of the pertussis vaccine may interfere with the immunizing efficiency of the diphtheria toxoid. This is a reasonable objection, since any interference with diphtheria immunization—a procedure of unquestioned value—by a material lacking similar acceptance would not be justifiable.

Reports concerning the action of multiple antigens are numerous, but have seldom established the actual quantitative relationship of the antigenic efficiency of the individual antigens when given alone or in combination. The studies of Schutze (1), Daughtry-Denmark (2), and Kendrick (3) using combined diphtheria toxoid and pertussis vaccine for example, have established that this combination is safe to use and at the same time apparently effective. They do not, however, establish the actual quantitative effect of the pertussis vaccine upon the immunizing efficiency of the diphtheria toxoid. The present study attempts to investigate this aspect of the problem.

Experimental Procedures

In the experiments reported, the diphtheria toxoid was a fluid toxoid containing 40 Lf's per cc. The pertussis vaccine was a concentrated preparation containing eleven hundred billion ($1,100 \times 10^9$) organisms per cc.

To prepare mixtures of these antigens, the organisms were added to different portions of toxoid so that the final concentration of organisms per cc. of toxoid was respectively:—(A) 20×10^9 ; (B) 40×10^9 ; (C) 80×10^9 ; (D) 160×10^9 . As shown in Table I, physiological saline was added to each preparation so that the concentration of diphtheria toxoid remained constant for each of the four mixtures and the control.

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TABLE I
DIPHTHERIA TOXOID—PERTUSSIS VACCINE MIXTURES, MADE UP TO A
FINAL VOLUME OF 15 CC. WITH 0.85 PER CENT SALINE

Preparation	Volume of Diphtheria Toxoid and Lf Value per cc.	Volume of Pertussis Vaccine and Concentration of Organisms per cc.
A	13 cc. 40 Lf	0.25 cc. 20×10^9
B	13 cc. 40 Lf	0.5 cc. 40×10^9
C	13 cc. 40 Lf	1.0 cc. 80×10^9
D	13 cc. 40 Lf	2.0 cc. 160×10^9
E (control)	13 cc. 40 Lf	0.0 cc.

These preparations were then regarded as separate products and the immunizing efficiency of the diphtheria toxoid in the following experiments was determined by the method of Greenberg et al. (4).

Two experiments were carried out with female guinea pigs drawn from a closed stock and of about the same weight (280-330 grams).

In the first experiment, recorded in Table II, fifty-four guinea pigs were used with each preparation. Each group was divided into three sub-groups of eighteen and each sub-group was inoculated subcutaneously with 1.0 cc. of a particular dilution: i. e., undiluted; 1:2 dilution; 1:4 dilution of the appropriate preparation. This had the effect of providing approximately 40, 20 and 10 Lf's of toxoid respectively.

On the nineteenth day following inoculation, each animal was Schick tested and the test read forty-eight hours later. The challenging dose for the Schick test was 10 MRD's. As controls, at the time the animals were Schick tested, five normal guinea pigs were inoculated with one-tenth the challenging dose and all showed an area of redness and swelling at least 6 mm. in diameter. In reading the results in the experimental group, an area of redness and swelling of at least 6 mm. was considered a positive test.

The results of this experiment, as shown in Table II, demonstrate that the presence of pertussis vaccine definitely augments the immunizing power of diphtheria toxoid. When a comparison is made between animals receiving the mixture of toxoid and vaccine with the control group receiving only toxoid, it is found that this difference is seen in all groups. On statistical analysis by the method of Bliss (5) it was found that preparation A was 260 per cent more effective than the control; that preparation B was 376 per cent more effective. Preparations C and D, which immunized all animals with one exception, do not

TABLE II
IMMUNIZATION WITH DIPHTHERIA TOXOID AND PERTUSSIS VACCINE
FIRST EXPERIMENT

Preparation	Dilution*	Number of Guinea Pigs	Results		Efficiency as Compared to Control**
			Number Schick neg.	Per cent Schick neg.	
A	undiluted	18	17	94	260 per cent (limits 106-638)
	1:2 dil.	18	17	94	
	1:4 dil.	18	14	78	
B	undiluted	18	18	100	376 per cent (limits 130-1090)
	1:2 dil.	18	17	94	
	1:4 dil.	18	16	89	
C	undiluted	18	18	100	Not determined
	1:2 dil.	18	18	100	
	1:4 dil.	18	18	100	
D	undiluted	18	18	100	Not determined
	1:2 dil.	18	18	100	
	1:4 dil.	18	17	94	
E (control)	undiluted	18	16	89	
	1:2 dil.	18	13	72	
	1:4 dil.	18	8	44	

*Both undiluted and diluted preparations were administered in a single injection of 1.0 cc.

**Calculated by the method of Bliss (5). Limits refers to limits of error for $P = .05$. This means that if the test were repeated 100 times, in 95 of the tests the results would fall within the limits given.

lend themselves to such numerical expression, but they are obviously more effective than the control preparation.

In order to obtain data lending itself to statistical analysis, a second experiment was carried out and is recorded in Table III.

On the basis of the earlier results, dosages were selected that would allow some animals to remain Schick positive in each group. To achieve this, preparations A and B were inoculated in dilutions of 1:4; 1:8 and 1:16 or approximately 10, 5 and 2.5 Lf's per cc. Preparations C and D were used in dilutions of 1:8; 1:16 and 1:32 or approximately 5, 2.5 and 1.25 Lf's per cc. The method of Schick testing was the same as on the first occasion.

As in the first experiment, all of the preparations containing both toxoid and vaccine were more effective in stimulating antitoxin production than was toxoid alone in the control group. Comparing immunizing efficiency by the statistical method mentioned previously, preparation A was 216 per cent; B was 313 per cent; C was 268 per cent; and D was 405 per cent more effective than the control. These results agree reasonably well with those found in the first experiment.

TABLE III
IMMUNIZATION WITH DIPHTHERIA TOXOID AND PERTUSSIS VACCINE
SECOND EXPERIMENT

Preparation	Dilution*	Number of Guinea Pigs	Results		Efficiency as Compared to Control**
			Number Schick neg.	Per cent Schick neg.	
A	1:4 dil.	18	14	78	216 per cent (limits 135-347)
	1:8 dil.	17	7	41	
	1:16 dil.	18	2	11	
B	1:4 dil.	17	13	76	313 per cent (limits 169-578)
	1:8 dil.	17	11	65	
	1:16 dil.	18	7	39	
C	1:8 dil.	17	9	53	268 per cent (limits 142-506)
	1:16 dil.	17	5	29	
	1:32 dil.	18	1	5.5	
D	1:8 dil.	18	14	78	405 per cent (limits 253-627)
	1:16 dil.	18	6	33	
	1:32 dil.	17	1	6	
E (control)	undiluted	16	14	87.5	
	1:2 dil.	18	13	72	
	1:4 dil.	17	7	41	

*Both undiluted and diluted preparations were administered in a single injection of 1.0 cc.

**Calculated by the method of Bliss (5).

SUMMARY

Evidence has been presented to show that the addition of pertussis vaccine to diphtheria toxoid enhances the immunizing power of the latter. Quantitative determinations have been carried out and generally these show that as the numbers of organisms are increased, within the limits of these experiments, the immunizing efficiency of the diphtheria toxoid is also increased.

The concentration of pertussis organisms such as is usually found in commercial preparations, and as exemplified by preparation A, increased the immunizing efficiency of the toxoid at least two-fold. Animal experiments would thus indicate that there is a definite advantage to be gained by the addition of pertussis organisms to diphtheria toxoid.

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The Retention of Ascorbic Acid in Canned Fruit Juices and Tomatoes During Storage After Opening

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AND

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JOHNSTONE (1) found that the loss of ascorbic acid from retail samples of canned tomato juice and citrus fruit juices during storage after opening at either room or refrigerator temperature for 1 to 2 days was low. Citrus fruits and juices are not produced in Canada and hence must be imported. During the war these imports were in short supply and in order to make available a Canadian fruit juice containing a comparable amount of ascorbic acid, apple juice was fortified with ascorbic acid so that it contained not less than 35 mgs. per 100 grams of juice. Some preliminary tests indicated that the ascorbic acid from this fortified apple juice was lost more rapidly on standing, after opening the can, than it was from canned grapefruit juice or tomato juice. Hence, a series of assays were made to compare the rate of loss of ascorbic acid from two brands of fortified apple juice and one brand each of canned tomato juice, tomatoes and grapefruit juice. While these tests were in progress, Scoular and Willard (2) reported that the average percentage loss of ascorbic acid from freshly opened cans was 3.0 for grapefruit juice, 3.7 for orange juice and 24.1 for ordinary apple juice, after refrigerated storage for one day.

Three series of assays were made on samples stored at room temperature and in a refrigerator, in June, 1944. The ascorbic-acid determinations were made by a method developed by S. H. Jackson, Hospital for Sick Children, Toronto, from the method of Evelyn, Malloy and Rosen (3), involving the use of 2-6 dichlorophenol indophenol and a photo-electric colorimeter. Depending upon the size, from 3 to 12 cans of the various products were opened and mixed for each test, stored in open glass containers, and samples taken at intervals. The results are shown in Table I.

It is obvious that the loss of ascorbic acid from the fortified apple juice is greater, either at room temperature or refrigerator temperature, than the loss from tomato juice, tomatoes or grapefruit juice. This difference cannot be attributed to variation in pH, since the change in pH, in the case of all juices, was insignificant during the course of the experiments. Further, all products were definitely acid, both fortified apple juices having a pH of 3.8, tomato juice 4.5, tomatoes 4.5 and grapefruit juice 3.7. These results do

TABLE I
AVERAGE LOSS OF ASCORBIC ACID DURING STORAGE

SOURCE	Hours of Storage	Milligrams per 100 Grams											Per cent Loss		
		0	3	7 1/2	24	27	31 1/2	48	51	58 1/2	72	75	Days of Storage		
Fortified Apple Juice #1	Room Temperature	39.8	36.9	35.4	29.1	29.9	24.1	25.4	17.5	17.9	8.9	7.6	27	36	78
	Refrigerator	39.8	36.8	35.0	31.9	31.4	28.8	25.0	22.7	21.5	16.3	17.3	20	37	59
Fortified Apple Juice #2	Room Temperature	42.6	41.6	39.9	35.7	33.2	32.4	25.2	26.7	22.3	18.4	16.7	16	41	52
	Refrigerator	42.6	41.5	40.1	38.2	35.6	33.7	33.7	31.4	29.7	22.4	21.6	10	21	47
Tomato Juice	Room Temperature	15.6	15.4	14.8	14.7	14.7	14.2	13.1	13.1	12.4	13.1	13.3	6	16	16
	Refrigerator	15.6	15.2	15.5	14.8	15.6	14.5	14.8	14.2	14.1	13.7	13.9	5	5	12
Tomatoes	Room Temperature	20.8	19.8	19.0	19.4	19.9	18.4	18.4	18.0	18.0	18.1	17.6	7	12	13
	Refrigerator	20.8	19.8	19.3	19.5	19.4	18.7	19.0	18.5	17.5	16.8	16.8	6	9	19
Grapefruit Juice	Room Temperature	32.4	32.7	30.3	30.5	31.7	29.5	27.0	26.3	24.6	21.4	22.9	6	23	34
	Refrigerator	32.4	31.7	31.3	32.2	31.3	32.4	32.4	31.4	31.6	29.0	28.7	1		10

indicate that the stability of synthetic ascorbic acid added to apple juice is markedly less than the stability of ascorbic acid naturally present in citrus fruit juices and tomatoes.

The loss of ascorbic acid from the canned tomato juice, tomatoes and grapefruit juice is small during storage, either at room temperature or in a refrigerator, for 24 hours after opening. It is not great for 48 hours' storage, particularly if stored in a refrigerator.

In almost all cases, the loss was less from the products stored in the refrigerator than from those stored at room temperature, although in many cases the differences are not great. However, in all cases, the juices stored at room temperature became unpalatable during the second day, and the tomatoes and tomato juices were fermenting. Those stored in the refrigerator were still palatable at the end of the test.

SUMMARY

The loss of ascorbic acid from fortified apple juice is greater than from tomato juice, tomatoes or grapefruit juice during storage in opened containers either at room temperature or in a refrigerator.

Loss of ascorbic acid from tomato juice, tomatoes and grapefruit juice under the same conditions was negligible for 24 hours' storage, and was small up to 48 hours, particularly if stored in a refrigerator.

All products tested became unpalatable during the second day when stored at room temperature.

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Experience with Salmonella Typing in Canada*

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IN response to a growing need, the Canadian Public Health Association appointed a *Committee on the Classification of Salmonella* in 1936 (1). For two years its laboratory work was done in the School of Hygiene at the University of Toronto, and subsequently in a Salmonella Typing Centre for Canada established in the Connaught Laboratories, University of Toronto. This centre was officially affiliated with the International Salmonella Centre in Copenhagen, which began operation in 1938 and continued until the director, Dr. F. Kauffmann, had to leave Denmark in 1943.

During 1940, responsibility for the Canadian Salmonella Typing Centre was transferred to the Western Division of the Connaught Laboratories at the University of British Columbia. Although war conditions necessitated curtailment of the typing service, stock cultures were maintained, and new type-cultures were added, through the courtesy of Dr. P. R. Edwards of the National Salmonella Centre in Lexington, Kentucky. Early in 1945 the full activities of the Centre were resumed.

The original objectives of the *Committee on the Classification of Salmonella*—to increase knowledge of the distribution and incidence of Salmonella types in Canada—were hampered by the war. As a result, many clinicians and public health workers fail to appreciate the importance of Salmonella epizootics and epidemics. The main purpose of this paper is to review the reports of Salmonella types isolated from Canadian sources, and to summarize the results of the examination of cultures received at the Canadian Salmonella Centre in the past two years. A secondary purpose is to stimulate renewed interest in the development of means of correlating information on salmonellosis in Canada.

SALMONELLA TYPES PREVIOUSLY REPORTED IN CANADA

The previous literature records the isolation in Canada of 28 Salmonella types. Of these, 16 types were known to be from human sources, 5 probably originated from humans, and 7 from animals or their products. Some of these types have been isolated from both human and other sources.

The available data do not permit an accurate order of incidence to be prepared. But there seems little doubt that *Eb. typhosa* (*S. typhi*) and *S. para-*

*Based on a paper presented at the fourteenth annual Christmas meeting of the Laboratory Section, Canadian Public Health Association, held in the Windsor Hotel, Montreal, December 16 and 17, 1946.

typhi B have been the types most frequently isolated to date from humans. These, and the less often recorded *S. newport*, *typhi murium*, *bareilly*, *paratyphi A*, *enteritidis*, and *bredeney*, have all been referred to in one or more of the annual reports (2, 3, 4) of the Ontario Department of Health for the years 1943, 1944, and 1945.* The isolation of *S. cholerae suis* from three humans has been briefly alluded to by Dolman (5). The remaining 6 types of human origin, isolated on single occasions, were reported as follows: *S. stanley* by Wyllie (6); *S. derby* and *S. montevideo* by the Ontario Department of Health (3); *S. manhattan*, *senftenberg*, and *newington*, also by that Department (4); and *S. oranienburg* by Kitching (7).

Beregoff-Gillow (8) also reported the isolation of *S. paratyphi B*, *typhi murium*, and *paratyphi A*, while the latter type has appeared in reports by Foley and Faille (9), Ferguson and MacNabb (10) and by the Committee on the Classification of Salmonella (11). Furthermore, *S. newport* has been reported by McClure and Crossley (12), and *S. bareilly* by Wyllie (13).

Although their sources cannot be determined with certainty, mention of the following 5 additional types in the annual reports of the Ontario Department of Health makes a human origin probable: *S. paratyphi C* and *S. virchow* (2), *S. brandenburg* and *S. moscow* (3) and *S. potsdam* (4). The reference to *S. brandenburg* and *S. moscow* represents their first recorded isolations in North America. The same department also records, but without specific reference to origin, the identification of *S. oranienburg* (3, 4) and *S. cholerae suis* (3).

The remaining 7 Salmonella types have been added to the Canadian record through investigations of chickens and egg-powders. *S. pullorum* infection in chickens has been reported by Younie (14), Glover and Connell (15), Gwatkin and Bond (16), and Chase (17); while Chase also obtained *S. tennessee* and *S. bonariensis* from hens. Among several types isolated from egg-powders processed in Canada, Gibbons and Moore (18) reported *S. thompson* and *S. minnesota*. Later, Gibbons (19) isolated *S. anatum* and *S. selandia* from Canadian egg-powders. (As long ago as 1914, *S. abortus equi* was reported by Schofield (20) as the cause of joint-ill—septic arthritis—in foals; but there is some doubt that a Salmonella is responsible for this infection, and since the serological identification was necessarily incomplete, this type is not included among those isolated in this country.)

Several of the types already mentioned as isolated from humans have also been obtained from other sources. For instance, *S. typhi murium*, *oranienburg*, *bareilly*, *manhattan*, and *newport* were obtained from egg-powders by Gibbons and Moore (18), and by Gibbons (19); while the latter report includes the isolation of *S. paratyphi B*, *bredeney*, *montevideo*, and *newington*. Gibbons and Moore also reported in their paper the first isolation of *S. potsdam* in North America. Later, Gibbons likewise found *S. potsdam* in egg-powder, while, as stated earlier, the Ontario Department of Health obtained this type from a presumably human source. *S. paratyphi B* may have been responsible for an

**S. columbensis* is also mentioned in these reports, but is not included here. Fulton (39) classified these organisms outside of the genus *Salmonella*, and Christensen (40) found them biochemically similar to *Paracolobactrum coliforme*, group 1.

infection in goats associated with cholecystitis; but this report was made by Schofield (21) in 1931, before *Salmonella* typing was on an adequate basis. Schofield (22) also obtained *S. typhi murium* from cattle, while *S. typhi murium* and *S. enteritidis* were isolated from foxes and mink by Stevenson (23). Finally, Chase (17) found *S. oranienburg* in chickens; Dolman (5) identified *S. bredeney* from dogs; and Schofield (24), Gwatkin and Moynihan (25), and others, have obtained *S. cholerae suis* from swine.

CANADIAN SALMONELLA TYPING CENTRE, 1945-47

During 27 months of the renewed typing service, dating to the end of March, 1947, a total of 350 cultures isolated from human sources were received from Nova Scotia, Quebec, Saskatchewan, Alberta, and British Columbia. Of these, 317 proved to be members of the genus *Salmonella*, and could be serologically classified into 21 types, as shown in Table I, where the strains

TABLE I
NUMBER OF STRAINS OF SALMONELLA TYPES IDENTIFIED AT TYPING CENTRE
1945-1947

SALMONELLA	PROVINCE OF ORIGIN					TOTAL
	B.C.	ALTA.	SASK.	QUE.	N.S.	
paratyphi A.....	6	-	-	-	-	6
paratyphi B.....	17	-	2	9	-	28
stanley.....	1	-	-	-	-	1
derby.....	2	-	-	2	-	4
typhi murium.....	90	5	4	-	-	99
bredey.....	-	-	-	1	-	1
thompson.....	52	2	-	3	-	57
oranienburg.....	19	3	-	3	-	25
bareilly.....	11	-	-	-	-	11
oregon.....	3	1	-	-	-	4
newport.....	50	-	-	3	8	61
miami.....	-	-	1	-	-	1
enteritidis.....	-	-	-	1	-	1
nyborg.....	-	1	-	-	-	1
cambridge.....	1	-	-	-	-	1
new brunswick.....	5	-	-	-	-	5
senftenberg.....	2	-	-	-	-	2
worthington.....	-	-	1	-	-	1
madelia.....	4	-	-	-	-	4
sundsvall.....	1	-	1	-	-	2
urbana.....	-	-	-	2	-	2
TOTAL.....	264	12	9	24	8	317

have been arranged according to the provinces from which they came. In the few instances where more than one culture was sent from the same individual, the strain has been listed once only. The remaining cultures fermented one or more of the test sugars (lactose, sucrose and salicin), and failed to agglutinate with *Salmonella* "O" sera. Most of these non-*Salmonella* cultures were late lactose-fermenters, and gave other biological reactions of the paracol groups. By tacit agreement, *Eb. typhosa* cultures were neither sought nor sent.

Among the 21 *Salmonella* types identified in this period, the following 9 types were new to Canadian literature: *S. oregon*, *new brunswick*, *madelia*, *sundsvall*, and *urbana*, all obtained from more than one source, and *S. miami*, *nyborg*, *cambridge*, and *worthington*, represented by single cultures. Of these, *S. nyborg*, *cambridge*, and *sundsvall* are types hitherto unreported from any source on the North American continent. These new types, added to the 28 previously reported, make a total of 37 *Salmonella* types identified and reported in Canada to date. Table II shows these types arranged according to their sequence in the Kauffmann-White Schema.

TABLE II
SALMONELLA TYPES REPORTED IN CANADA TO DATE

GROUP	SALMONELLA	SOMATIC ANTIGENS	FLAGELLAR ANTIGENS	
			Phase 1.	Phase 2.
A	paratyphi A	(I), II, XII	a	-
B	paratyphi B	(I), IV, (V), XII	b	1, 2
	stanley	IV, V, XII	d	1, 2
	derby	(I), IV, XII	f, g	-
	typhi murium	(I), IV, (V), XII	i	1, 2, 3
	brandenburg	IV, XII	l, v	e, n, z ₁₃
C	bredeley	(I), IV, XXVII, XII	l, v	1, 7
	paratyphi C	VI, VII, (Vi)	c	1, 5
	cholerae suis	VI, VII	(c)	1, 5
	montevideo	VI, VII	g, m, s	-
	thompson	VI, VII	(k)	1, 5
	potsdam	VI, VII	l, v	e, n, z ₁₃
	oranienburg	VI, VII	m, t	-
	virchow	VI, VII	r	1, 2, 3
	bareilly	VI, VII	y	1, 5
	tennessee	VI, VII	z ₁₃	-
	oregon	VI, VIII	d	1, 2, 3
	manhattan	VI, VIII	d	1, 5
	newport	VI, VIII	e, h	1, 2, 3
	bonariensis	VI, VIII	i	e, n, x
D	pullorum	IX, XII	-	-
	miami	I, IX, XII	a	1, 5
	(Eb.) typhosa	IX, XII, (Vi)	d	-
	enteritidis	(I), IX, XII	g, m	-
E	moscow	IX, XII	g, q	-
	anatum	III, X, XXVI	e, h	1, 6
	nyborg	III, X, XXVI	e, h	1, 7
	cambridge	III, XV	e, h	1, w
	newington	III, XV	e, h	1, 6
	selandia	III, XV	e, h	1, 7
	new brunswick	III, XV	l, v	1, 7
	senftenberg	I, III, XIX	g, s, t	-
F	worthington	I, XIII, XXIII	l, w	z
	madelia	(I), VI, XIV, XXV	y	1, 7
	sundsvall	I, VI, XIV, XXV	z	e, n, x
	minnesota	XXI, XXVI	b	e, n, x
	urbana	XXX	b	e, n, x

In our series, *S. typhi murium* occurred most frequently, followed by *S. newport*, *thompson*, *paratyphi B*, and *oranienburg*. These five types together accounted for 85 per cent of the *Salmonella* cultures received. The high incidence of *S. thompson* reflects several small outbreaks of infection with this

type in Vancouver during the summer of 1946. No common source of these outbreaks was determined. However, this type would seem to be more prevalent in Canada than in the United States, where relatively few human cases of salmonellosis-thompson occur. Incidentally, *S. thompson* has been isolated much less frequently in the United States from egg-powders than from those processed in Canada (26).

The only recorded identification of *S. paratyphi A* in Canada since 1939 (11) has been a single culture reported from Ontario (4) in 1945. Six strains of this type were isolated in March, 1947, at the Provincial Laboratories in Vancouver from faecal specimens received from Trail, B.C., which was recently the scene of a small, apparently milk-borne outbreak of paratyphoid fever. The reappearance of *S. paratyphi A*, and the introduction of other exotic types by home-comers and immigrants from the Orient and Europe, may be expected.

All of the types listed in Table II have been previously known to cause human infections, except *S. maderia*, and possibly *S. cambridge*. The rarity of these two types, and the absence of earlier reports on their infectivity for man, justify a few additional comments upon them.

Salmonellosis-maderia

Cherry, Edwards and Bruner (27) first isolated *S. maderia* in 1943 from the liver of a poult. In 1944, Hinshaw, McNeil and Taylor (28) noted that this type had been obtained only from infections in birds; but before their paper was published, the isolation of *S. maderia* from faeces of two healthy food-handlers in Florida was reported by Galton and Quan (29).

During 1945, 4 *Salmonella* strains isolated at the Provincial Laboratories in Vancouver from epidemiologically unrelated sources were identified as *S. maderia*.* The identity of these cultures was confirmed by appropriate absorption tests.

The first culture was obtained in the early summer of 1945 from faeces of a healthy adult carrier, who was discovered in the course of a routine check of contacts, following his daughter's development of an infection with *S. typhi murium*. About two months later, the second strain was isolated on two occasions from faeces of a male infant, 8 months of age, who was suffering from profuse muco-sanguinous diarrhoea. The patient died after 17 days of illness. Stool examination of contacts yielded no enteric pathogens, although the parents had had diarrhoea, lasting about one day, just prior to the onset of their child's illness.

The third strain was isolated a few days later from faeces of a female infant, aged 2½ months. The diarrhoeal attack subsided rapidly, and recovery was complete after brief hospitalization. Contacts gave no history of intestinal upsets, and stool examinations were negative.

The fourth strain was obtained nearly 4 months later from faeces of a female adult with diarrhoea of three days' duration. This patient was one of 42 persons who developed diarrhoea, lasting from one to three days, on an

*Dr. R. M. Shaw (41), Director of the Alberta Provincial Laboratory at Edmonton, isolated *S. maderia* from a case of salmonellosis in 1946.

average of 15 hours after eating some improperly refrigerated veal roast and gravy. Although the case histories suggested salmonellosis, stool cultures of several other recovered patients and of food-handlers proved negative, and this single isolation of *S. maderia* may have been fortuitous.

Salmonellosis-cambridge

In 1944, Taylor (30) at the Salmonella Reference Laboratory in London, England, first designated as *S. cambridge* a new type of Salmonella which had been isolated, along with *Sh. sonnei*, from faeces of an R.A.F. cadet with an enteric infection. Unfortunately, publication restrictions have delayed Doctor Taylor's report, but she kindly sent us a résumé of the case from which the original strain was isolated.

The strain identified by us is apparently the second of its type to have been isolated. It was submitted by the Provincial Laboratories in Vancouver in the late summer of 1945, having been obtained from faeces of an adult female living in Quesnel, B.C., a small town in the interior of the Province. Because of its rarity, the identity of this strain was confirmed by absorption tests.

A full report of the patient's illness was received from her physician (31). He described a severe case of febrile gastro-enteritis lasting about one week. The source of her infection was not determined. The patient's son had been in the R.C.A.F., and had returned from England some weeks before his mother's illness; but this clue could not be pursued. No other cases of enteritis were reported in the family or community at the time of her infection. A severe epidemic of diarrhoea had occurred in the town during the spring, but no unusual Salmonella types were isolated at that time.

DISCUSSION

Since the diagnostic antigenic schema for the genus *Salmonella* was devised, the number of recognized types has gradually increased. In 1932, Savage (32) indicated that over 25 serological types and varieties had been differentiated. The 1934 report (33) of the Salmonella Subcommittee of the International Society of Microbiology listed 44 types and varieties, while its 1939 report (34) identified 74 types. The unofficial scheme now includes over 150 types. The 37 types alluded to in this report as having been isolated from all sources in Canada thus represent only about 25 per cent of all known Salmonella types. A true picture of the variety and distribution of types in Canada is of course lacking. Of the 317 Salmonella cultures examined in the two-year period, it is evident from Table I that 264, or 83 per cent, were from British Columbia; and of the 21 types identified by us, 15 were isolated from persons domiciled in this Province. There has undoubtedly been a high incidence of salmonellosis in British Columbia in the past few years, but only a small proportion of strains isolated outside this province have been sent to the Typing Centre. Canada as a whole would have benefited from the clearer picture of the distribution of Salmonella strains which would have been available had all the provinces submitted their less common types for identification.

Some objections to the serological identification of *Salmonella* types have been raised, e.g. by Pacheco and Costa (35), on the grounds of the increasing complexity of the diagnostic schema through the recognition of many new types. Nevertheless, Kauffmann's (36) procedure for antigenic analysis, as adapted and modified by Edwards and Bruner (37), still provides a workable system employing simple and well-known techniques. Even complexity would not justify condemning the scheme, if it provided sufficiently useful information for the epidemiologist. There seems no doubt that identification of the *Salmonella* type involved in a localized outbreak can be of crucial assistance when attempting to trace the source. Furthermore, as Smith (38) has pointed out, antigenic analysis has been responsible for all our knowledge of the biological significance, and the interrelationships among types, of the genus *Salmonella*. The evidence that certain *Salmonella* antigens are possessed by members of other genera should be a spur to continued study, not alone as an aid to progress in taxonomy, but also to promote knowledge of bacteria on the borderlines of pathogenicity.

The Kauffmann-White schema cannot reach its maximum usefulness until more information on *Salmonella* types has been gathered. Dolman (5) has emphasized the futility of limiting our interest in salmonellosis to the discovery of human cases and carriers, for animal reservoirs may be equally dangerous to the public health and may present difficult problems in control. Although comparatively few studies of foodstuffs and of animal hosts have been recorded in Canada, it has been shown in this country, as in others, that many *Salmonella* types pathogenic for man may contaminate egg-powders, and infect animals. *Salmonella* outbreaks are commonly traceable to human cases and carriers; but the epidemiological information may be incomplete, and the key to effective prevention missing, until the original source of the pathogen has been discovered. Hence, any worth-while attack upon the *Salmonella* problem entails a broad approach, with close co-operation between the laboratory worker and the practising physician, medical health officer, veterinarian, and sanitarian.

The logical first step in coping with the *Salmonella* problem in Canada would seem to be revival of the *Committee on the Classification of Salmonella*, so expanded as to provide nation-wide representation from each of the five professional groups just mentioned. This committee should have for objectives the exchange of epidemiological information gathered by each Province, and the identification of *Salmonella* types which are too uncommon or troublesome for the routine procedures of the public health laboratory.

While each Provincial Laboratory might well maintain a supply of standard (crude and absorbed) sera for the identification of the more frequently encountered types, a *Salmonella* Typing Centre should be operated, to which all laboratories throughout Canada would gladly refer doubtful or difficult cultures. Such an arrangement would undoubtedly overtax the resources of the present centre, and it is suggested that the Laboratory of Hygiene of the Department of National Health and Welfare might more fittingly assume this responsibility. Indeed, a new centre under the auspices of the Dominion Government might ultimately include within its scope the examination and

identification of other enteric pathogens, and thus be ready to affiliate with an International Reference Centre for Enteric Micro-organisms which the World Health Organization could perhaps be called upon to establish.

SUMMARY

1. Hitherto, 28 *Salmonella* types have been reported in Canada. Included among these were the first isolations in North America of *S. brandenburg*, *potsdam*, and *moscow*.

2. During a period of 27 months, ending March 31, 1947, 317 cultures were identified as members of the genus *Salmonella* at the Canadian Salmonella Typing Centre. These were classified into 21 types, including *S. nyborg*, *cambridge*, and *sundsvall*, recorded for the first time in North America, while *S. oregon*, *new brunswick*, *miami*, *madelia*, *worthington*, and *urbana* had not been previously reported in Canada. A total of 37 types have therefore to date been identified and reported in Canada.

3. The pathogenicity for man of *S. madelia* and *S. cambridge* is reported, the former having caused the fatal illness of an infant.

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Employment Service

The Canadian Public Health Association announces the formation of an employment service, functioning through a special section of the Journal. Advertisements regarding "positions available" and "personnel available" will be published in from one to four consecutive issues, depending upon the requirements of the agency or person concerned. They will be limited to seventy words or less, with a confidential box number if desired.

There will be no charge for this service to members of the Association. Health agencies will be charged a flat rate of \$10 for the advertisements (up to four consecutive issues) and for the service. The rate for non-members will be \$5.

The service will include confidential clearing of information between prospective employer and/or employee.

Canadian Journal of Public Health

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MISS ELIZABETH LAURIE SMELLIE, C.B.E., R.R.C., LL.D.

A DISTINGUISHED career of public service was officially concluded last month when Miss Elizabeth L. Smellie retired from the post of Chief Superintendent of the Victorian Order of Nurses for Canada, an appointment which she has filled most ably for more than twenty years. Miss Smellie has made a unique contribution to public health in this country, and the present notable stature of the Order is evidence of the soundness and inspiration of her leadership. Shortly after becoming Chief Superintendent, she put into effect a program which was based on the conviction that there could be no divorcement of public health and morbidity nursing if the best was to be achieved in each field. Under her direction, the Victorian Order of Nurses asked those seeking posts with the Order to secure postgraduate training in public health nursing. She had long recognized the fact that the best way of creating public interest in the "hygiènes" was when health teaching was complementary to some type of service rendered.

At the outbreak of World War II, Miss Smellie, who had given outstanding service in the first World War, was recalled to active duty and, with the rank of colonel—the first Canadian woman to hold that title—she built the Nursing Service of the Royal Canadian Army Medical Corps into one of the most efficient units of its kind. She was also largely responsible for the organization of the women's divisions of the armed services.

As Vice-President, Chairman of the Public Health Nursing Section, and a member of various committees, Miss Smellie has made an outstanding contribution to the Canadian Public Health Association, as indeed she did to any organization that has been privileged to have her as a member. Last year she was made an honorary life member of the Association, the first nurse to receive this award. She has also inevitably acquired a number of other "firsts", having been the first woman to be elected Vice-President of the American Public Health Association and the first woman to receive the degree of LL.D. from the University of Western Ontario.

Although Miss Smellie has severed her connection with the Victorian Order of Nurses, it is difficult to conceive that she will not continue to make a significant contribution to the field of nursing in this country for many years to come.

The Canadian Public Health Association

1946-1947*

(Part II)

REPORT OF THE NATIONAL COMMITTEE FOR SCHOOL HEALTH RESEARCH

SPONSORED BY THE CANADIAN EDUCATION ASSOCIATION
AND THE CANADIAN PUBLIC HEALTH ASSOCIATION

THE school health research program is now in its second year. As reported earlier, the first year was an exploratory one and a general survey of all factors affecting the health of the school child was undertaken. The report of this survey is now completed. Everyone who is interested in the health of the Canadian school child will be keenly interested in the picture which this health survey has revealed. It is intended, therefore, to distribute some 10,000 copies of the report to departments of health and education and to school boards, inspectors and principals across Canada. Since data were received from 26,101 elementary schools or 90 per cent of all such schools in Canada and from 81,60 secondary school classrooms or 75 per cent of all such classrooms in Canada, the report may be said to offer the first reliable picture of existing conditions in the schools of the Dominion. This extent of participation in the survey is indicative of the interest in the health of the child which has been aroused by the organization of the school health research program. The provinces are now assured that something constructive is being accomplished.

The guiding body of the research program, the National Committee for School Health Research, has made certain definite recommendations to the proper provincial authorities as the result of the health survey. It is the hope of the Committee that these recommendations will receive immediate attention in each province. There is some justification in thinking that this will be so since the provinces were responsible for the suggestion that a need had arisen in Canada for a comprehensive school health research program. The first fruits of this program are now available; it becomes the duty of each province to take action.

The health survey was undertaken not only to reveal existing conditions in Canadian schools but also to indicate problems in the field of health which required research study. One of these problems forms the major research project for this year, 1946-1947. The study has been titled *Absenteeism* and, as the name implies, is an investigation of the causes of absence from school.

*Reports presented at the thirty-fifth annual meeting of the Canadian Public Health Association, held in the Chateau Frontenac, Quebec, May 19-22, 1947.

THE ABSENTEEISM STUDY

The need for a study of causes of absence from school had been foreseen a few years ago, and Dr. N. L. Burnette of the Metropolitan Life, together with Mr. R. H. Roberts of the Normal School in London, Ontario, were the first to investigate the problem on a Dominion-wide scale. The health survey only verified the opinions of these men, viz., that little was known in Canada of the relationship of health to school attendance. In order that the original investigation by Dr. Burnette and Mr. Roberts might not be forgotten in the provinces, a complete study of the problem was launched across Canada when schools opened in September 1946. Both Dr. Burnette and Mr. Roberts have assisted greatly in the planning of this study. The project will proceed for one school year, which means that all data will be submitted for analysis after June 30, 1947. It is planned to complete the analysis during the summer in order to publish a report in September.

The extent of the study is worthy of mention. It was intended originally to select 24 urban teachers and 24 rural teachers in each province for participation in the project. Since the schools of Quebec are administered separately for the Protestants and Catholics, it is necessary to think of Canada in terms of ten provinces. Hence the original sample included 240 urban and 240 rural teachers across the Dominion. This sample offered at least two classes of each grade from I to XII in the urban schools and an adequate coverage of all grades, I to XII in the rural schools.

Such has been the interest in the study, however, that numerous requests for participation have been received from larger school boards, principals and teachers. This has resulted in a great increase in the sample; the following table shows the number of teachers who are now participating.

THE NUMBER OF TEACHERS INCLUDED IN THE STUDY OF ABSENTEEISM

PROVINCE	URBAN	RURAL
British Columbia	83	31
Alberta	24	24
Saskatchewan	28	23
Manitoba	50	31
Ontario	63	51
Quebec—Protestant	54	34
Quebec—Catholic	53	29
New Brunswick	25	24
Nova Scotia	27	26
Prince Edward Island	23	24
TOTAL	430	297
Total teacher participation (urban plus rural)	727	
Approximate pupil participation	25,000	

The sample which now obtains offers data on all grades in each of the larger cities in Canada as well as adequate coverage of smaller cities and rural areas. Each teacher is recording all absences on a special form and in most cases it has been possible to arrange that the school doctor or nurse assist the teacher in the study. All provinces have been visited by the Director since the study commenced and some 207 of the teachers concerned have been interviewed. The

progress appears to be satisfactory; records are being kept up to date, teachers are keenly interested in the project, and health and education administrators have expressed genuine interest in the study.

In passing it should be mentioned that a parallel study has been undertaken in the State of California by the Metropolitan Life Insurance Company. This study includes some 5,000 children and will offer interesting comparisons with Canadian children. I would like to express the appreciation of the National Committee for School Health Research for the assistance which has been given by the Metropolitan Life Insurance Company to the study of absenteeism in Canada. Problems of organization and of analysis of data have received careful consideration by the Health and Welfare and the Statistical divisions of the company head office in New York. This assistance has been of tremendous value in ensuring that the study will be successful here in Canada.

MENTAL HEALTH STUDY

The health survey revealed a definite lack of appreciation of mental health problems among school children on the part of inspectors, principals and teachers. A study was undertaken, therefore, which would result in the preparation of a handbook for use in teacher-training institutions. This handbook is to include sample case-histories, reports of certain groups who are working with mental health problems in the schools, and a synopsis of the most frequent and most serious mental health problems among school children. An attempt has been made to interview everyone in Canada who records histories of school children who have been referred as mental health problems. Data on types of problems have been gathered and analyzed from all schools which participated in the health survey. The handbook is now in preparation and it is hoped that it will be complete before the fall school term commences in September.

FUTURE STUDIES

Before the publication of the report on the health survey, it was evident that certain conditions which had been revealed required further study. Accordingly the Director investigated the advisability and feasibility of conducting certain studies which he thought important. These have been reported to the National Committee for School Health Research and form the basis for future plans which the Committee made after a meeting to discuss the final report of the health survey. The following plans have been prepared by the National Committee for School Health Research.

1. A Comprehensive Study of Teacher-Training Programs in Relation to Health Teaching and Physical Education

This study has been given top priority. The health survey revealed the need for a study such as this and the National Committee for School Health Research feels that it is imperative at this stage of the health research program to know what is taught in each teacher-training institution, the qualifications of the instructors and the methods of testing.

2. A Comprehensive Study of School Health Services

The health survey indicated that health services in the provinces had progressed to the point where a special study was essential before a preliminary assessment could be made. It is intended to compile a report which will treat separately the health services of each province.

3. A Survey of Vision and Hearing

The health survey revealed very unsatisfactory conditions with respect to lighting (artificial and natural) in Canadian schools. These conditions have, undoubtedly, affected the vision of school children. It seems feasible to include a survey of hearing together with that of vision.

4. A Synthesis of Studies of School Lighting

As mentioned above, the conditions in schools with respect to lighting are most unsatisfactory. Yet much has been written on the subject by persons well qualified to investigate the problem. The time has come, therefore, to compile a handbook on school lighting which will include the findings of the more recent studies. It is intended that such a handbook would form the basis for a revision of departmental regulations with respect to lighting and prove of value to school boards and school inspectors.

5. A Study of School Caretaking

The health survey showed that caretaking facilities in the schools were considered inadequate by school inspectors and principals. This study aims at a survey of any training courses which are offered for caretakers with a view to the organization of a correspondence course for untrained school caretakers.

6. Re-examination of the Content of Health Instruction and Physical Education

The original investigation into this problem has been requested of the Canadian Public Health Association. When this has been accomplished, it is intended to study (a) the best measures of motivating health teaching; (b) the best teaching methods in health instruction at different grade levels. Each of the above would be in the form of a controlled experiment in which control and experimental groups participate.

7. A Study of the Incidence and Causes of Poor Mental Health Among Teachers

In the general survey it was alarming to note the number of teachers who were rated, by inspectors and principals, as having inferior personal mental health. This study will investigate causes, etc., for such ratings.

8. A Study of Safety Education in Canada.

This study is the result of a request from the Canadian Teachers Federation. Preliminary investigation made by the Director showed that there was need for such a study.

In conclusion may I say that the values of the school health research program in Canada are quite apparent. For example, the report of the health survey offers the first complete picture of conditions in our schools; it is reasonable to expect that this report will result in better conditions for our children. Certainly it will offer topics for discussion in all groups who are interested in the health of our youth. The report on absenteeism will include the first morbidity statistics on the school-age group. It will also reveal causes of absence which, when known, can be alleviated. As these research studies progress, an increasing number of teachers become participants. This must result in greater health-consciousness among teachers and so among pupils.

A. J. PHILLIPS, Ph.D.,

*Director of the Study, National
Committee for School Health
Research.*

REPORT OF THE COMMITTEE ON THE CERTIFICATION OF SANITARY INSPECTORS

DURING the war, many members of field hygiene sections and other sanitary groups in the Services became interested in sanitary inspection as a civilian occupation. To expedite their obtaining the *Certificate in Sanitary Inspection* (Canada) on their return, the Committee provided special correspondence courses during the fall of 1945 and the winter of 1946, and arranged with health departments for training facilities. The Department of Veterans' Affairs made provision for a period of training covering from four to six months which permitted candidates to obtain field work with health departments and at the same time receive instruction through the correspondence courses conducted by the Association. In addition to the annual examinations, held as usual in September, special examinations for ex-servicemen were held in March and June, 1946, in the various provincial centres—Vancouver, Edmonton, Regina, Winnipeg, Toronto, Saint John, and Halifax. In the three examinations, one hundred and twenty-four candidates were successful.

PROVINCE	MARCH	JUNE	SEPTEMBER	TOTALS
B.C.	-	1	3	4
Alta.	2	5	1	8
Sask.	-	6	6	12
Man.	9	-	6	15
Ont.	16	23	15	54
Que.	-	-	21	21
N.B.	-	1	-	1
N.S.	1	2	6	9
Totals	28	38	58	124

The Committee gratefully acknowledges the assistance of the members of the various provincial examining boards, many of whom served for the three examinations. With the granting of the certificate to this group, five hundred and ten inspectors have obtained the Canadian qualification since the examinations were inaugurated in 1935.

When the majority of last year's candidates were registered for the examinations, during the fall of 1945 and the early winter of 1946, it was confidently expected that there would be employment for them with the health units or health districts that were planned for the various provinces. Unfortunately, the extension of health services has been seriously impeded in most of the provinces, with the result that many of the successful candidates have been unable to obtain positions. To meet this situation, it was considered necessary to restrict registration, during the year beginning July 1, 1946, to candidates who either had served as sanitary inspectors in Canada prior to June 30 or had had extensive experience in sanitary inspection with some branch of the Services. During the past year, each candidate has been advised to discuss with his provincial or local health department the opportunities for employment, before proceeding with his preparation for the examinations. However, even though early employment seemed doubtful, many candidates have gone ahead with their plans, indicating that they would seek other work until an appointment in sanitary inspection was available. Sixty candidates have been registered for the 1947 examinations, and another thirty whose applications have been approved by the Committee will decide later whether or not they will take the examinations this year. It is hoped that by mid-summer the employment situation will have improved to the extent that it will be possible to remove the restriction on registration.

Thirty-three candidate have been enrolled for the current session of the correspondence course, which opened on February 24, 1947. Work has been started on a revised edition of the Manual for Sanitary Inspectors, of which some 2,000 copies have been distributed since it was first issued in 1937. To date, revision of one-third of the 275 pages has been completed.

J. G. CUNNINGHAM, M.B., D.P.H., *Chairman.*

REPORT OF THE VITAL STATISTICS SECTION

THE annual meeting of the Vital Statistics Section was held in Toronto in May 1946 as part of the Association's annual meeting. One session was held jointly with the Section of Epidemiology and at this meeting papers were presented on subjects of interest to both sections. The other session was devoted to the presentation of committee reports and the discussion of business.

The report of the Sub-committee on the Revision of the International List of Causes of Death was presented as an interim report on the activities of the United States Sub-committee of the International Conference. This report was published in the May issue of the Journal.

The report of the Committee on the Form and Content of Annual Vital Statistics Reports was published in the September issue of the Journal and copies of it have been forwarded to registrars of vital statistics throughout Canada and the United States, with requests for comment and suggestions. Several very helpful replies have been received.

The Committee on Stillbirths made a progress report stating that the trial

of the experimental draft of the Classification of Causes of Stillbirth is being carried on. A further report will be presented when a sufficiently thorough test has been made to warrant proper recommendations prior to its final adoption.

The Committee on Population was unable to make any studies on this subject owing to the changes during the war. However, the members are planning to undertake studies on this most important phase of public health welfare. This committee will no doubt be requested to assist the Canadian representative (Mr. J. T. Marshall) on the Population Commission of the Economic and Social Council of the United Nations in the preparation of material.

A special committee was appointed to study and review the existing Section committees. The chairman presented a report with suggestions for strengthening some of the committees and dissolving others.

The committee appointed by the Vital Statistics Section for the Revision of the International Lists of Illness and Causes of Death has worked in conjunction with the United States Committee which has undertaken the preparatory work for the Sixth Decennial Revision in 1948.

(1) "In compliance with a resolution of the Fifth International Conference, the Secretary of State of the United States in 1945 appointed the U.S. Committee on Joint Causes of Death under the chairmanship of Dr. Lowell J. Reed, Vice-President and Professor of Biostatistics of the Johns Hopkins University. Members and Consultants of this committee included representatives of the Canadian and British Governments and the Health Section of the League of Nations. Recognizing the general trend of thought with regard to morbidity and mortality statistical lists, this Committee decided that before taking up the matter of joint causes, it would be advantageous to consider classification from the point of view of morbidity and mortality since the joint cause problem pertains to both types of statistics.

"The Committee also took cognizance of that part of the resolution of the last International Conference on International List of Diseases that recommended that the 'various National Lists in use should, as far as possible, be brought in line with the detailed International List of Causes of Death'. It recognized that the classification of sickness and injury is closely linked with the classification of causes of death. The view that such lists are fundamentally different arises from the erroneous belief that the International List is a classification of terminal causes, whereas it is in fact based upon the morbid condition which initiated the train of events ultimately resulting in death. The Committee believed that, in order to utilize fully both morbidity and mortality statistics, the classification of diseases for both purposes should not only be comparable but if possible there should be a single list.

"Furthermore, an increasing number of statistical organizations are processing medical records involving both sickness and death. Even in organizations which compile only morbidity statistics, fatal as well as non-fatal cases must be coded. A single list, therefore, greatly facilitates the coding operations in such offices. It also provides a common base for comparison of morbidity and mortality statistics, which does not now exist.

"A sub-committee, therefore, was appointed which prepared, during the period December 10, 1945, to February 11, 1946, a preliminary draft of a 'Proposed Statistical Classification of Diseases, Injuries and Causes of Death'. This work received the approval of the full committee on February 11, 1946. The classification was then subjected to trials and review by various agencies and individuals in Canada, England and the United States. After making further modifications based on these studies, the U.S. Committee met in Ottawa, Canada, on March 10, 1947, and approved a final draft of the proposed classifications."

(1) International Statistical Classification of Diseases, Injuries and Causes of Death, WHO.IC/MS/I, April, 1947. pp. ix and x.

Dr. J. Wyllie, Chairman of the Vital Statistics Section's Committee, was one of the Canadian representatives on the United States Committee. Two other members of the Vital Statistics Section's Committee, Dr. F. S. Burke, Chairman of the former committee on Morbidity Classification and Statistics which was consolidated with the committee under Dr. Wyllie, and Mr. J. T. Marshall, Secretary of the Vital Statistics Section, were also representatives of the United States Committee.

(2) "The International Committee for the Preparation of the Sixth Revision of International Lists of Diseases and Causes of Death was appointed in January, 1947, by the Chairman and the Executive Secretary of the Interim Commission of the World Health Organization in fulfilment of the responsibility entrusted to it by the International Health Conference held in New York City in June-July 1946. This committee, in carrying out its task and taking full notice of the prevailing opinion concerning morbidity and mortality classification, reviewed and revised at its First Session held in Ottawa, Canada, in March, 1947, the above-mentioned document which had been prepared by the U.S. Committee on Joint Causes of Death and made available to the International Committee for its consideration."

Dr. J. Wyllie was appointed a member of the International Committee.

The International Statistical Classification is being distributed to the member nations for comments and suggestions. These will be considered by the International Committee in the fall of 1947 at its second session. It is understood that the Committee of the Vital Statistics Section of the Canadian Public Health Association will be requested to review the document and forward its suggestions to the Deputy Minister of National Health as Chairman of the Technical Medical Advisory Committee on Vital Statistics to the Dominion Statistician, so that the recommendations may be reviewed and co-ordinated with the proposals made by the provinces and other organizations. The Technical Medical Advisory Committee will be responsible for the preparation of Canada's submission to the International Committee.

The Committee of the Section will report to the meeting of the Section to be held in Quebec City, May 20-22, 1947. This Section Committee has a heavy responsibility and it is hoped that every member of the Association will give full co-operation in this matter.

J. T. MARSHALL, *Secretary.*

(2) *Ibid.* p. x.

SANITARY INSPECTION

THE SANITARY INSPECTOR IN MODERN HEALTH WORK

P. A. BELANGER, M.D., D.P.H.

*Medical Officer of Health
Prescott and Russell Counties Health Unit
Hawkesbury, Ontario*

THE DAYS when the sanitary inspector did nothing else but cover town and country, warning people or having them in police court for offences against the Public Health Act, are on their way out. Doubtless there are still many cases and instances that come under this heading; and unfortunately the sanitary inspector still spends too much time, money, and energy checking on complaints and nuisances, 75 per cent of which have little or nothing to do with health.

Will the day ever come when these nuisances and complaints can be left to the police, and the sanitary inspector called in only as a specialist and an adviser? It is difficult to say. But what can be said is that the trend in public health to-day is towards the educational side of things and the sanitary inspector is called upon to play a more important part in generalized public health programs. He therefore cannot be limited to the old routine of placarding, inspecting refuse dumps, etc.

To-day the work of the sanitary inspector is intimately linked with other problems, such as venereal disease, tuberculosis, school health, etc. He travels as much as the public health nurse, and certainly more than the medical officer of health. Therefore, with his numerous daily contacts he can and should preach the gospel of health. The word "preach" is the wrong one, because health teaching

must not take the form and shape of speeches and lectures only. We must look carefully for the opportune moment and the proper opening, and, when we have found it, let our words drop on ripe and prepared soil. This is an every-day task that takes time and patience but eventually gives results. These results become our greatest satisfaction.

If, therefore, the sanitary inspector is called upon to become an educator, not only in his own field of sanitation but also in other branches pertaining to health, and if he is to have a word to say and a part to play in a generalized program, what changes must be brought about in order to answer the present and future needs?

The sanitary inspector's background and his education should be of such quality as to permit units and health departments to give him greater responsibilities in dealing with the public, for, as we know, the question of human relations is becoming more important each day.

The sanitary inspector should, by his personal life, set an example to his fellow-citizens, not only in matters pertaining to health but in the other spheres of every-day activities. This will gain him the respect and confidence of the public. Without these he cannot operate.

The purely technical training of our inspectors is, generally speaking, well taken care of. Our present system

An address given at a meeting of the Eastern Ontario Section of the Ontario Branch, Canadian Institute of Sanitary Inspectors, held in Hawkesbury on December 15, 1946, in conjunction with the official opening of the Prescott and Russell Counties Health Unit.

gives him most of the necessary knowledge to enable him to carry out his work. Furthermore, this training does not stop when he obtains his certificate. The Associations are doing all they can to maintain and augment this basic training through scientific meetings; such meetings are essential factors of professional progress. Joint meetings with other public health workers are also important and beneficial.

However, more could be done and should be done if at all possible. For instance, it is the opinion of many that the course by correspondence should be supplemented by a few months of demonstrations and lectures in a school. This would establish a more personal contact between teacher and student. It would permit the very valuable adjunct of discussions. It would also help in the appraisal of the future inspector.

Postgraduate studies and refresher courses would also be most welcome and useful. They would assure a high

degree of up-to-date knowledge. Towards this end, certain universities are introducing lectures and laboratory periods at night for qualified sanitary inspectors.

These few suggestions should not create the impression that the sanitary inspector should be a university graduate, for practical experience and in-training are still the best teachers. But it is felt that the sanitary inspector of to-day requires something more than these if he is called upon to play a greater role in health work. This "something more" should gain him still more respect. It would prevent boredom and help the inspector to get out of the rut so often formed by too strict an adherence to daily routine. This "something more" would give him more confidence and keep him keen and alert. It would develop interest in health work. Finally, higher standards, whether personal or educational, eventually call for higher recognition and higher remuneration.

CORRESPONDENCE

To the Editor:

Findings reported by Mull and Fouts (*J. Milk & Food Tech.*, 1947, 10:102) concerning concentrations of "Roccal" detectable in milk by taste prompted us to make additional tests on this point. The results show that the "critical" concentration of four quaternary ammonium compounds reported by Johns and Pritchard in the December 1946 issue of the *Canadian Journal of Public Health* were ten times too high, having been based upon the commercial products (10% solution) rather than upon the active ingredients. These should read as follows:

<i>Product</i>	<i>Parts per million, active ingredient</i>
Emulsept	56
Roccal	15
Hyamine 1622	10
R-2-L	7

I regret that the miscalculations were not detected earlier.

C. K. JOHNS, Bacteriologist
Division of Bacteriology
and Dairy Research, Department
of Agriculture, Ottawa.

May 21, 1947

ASSOCIATION NEWS

THE THIRTY-FIFTH ANNUAL MEETING

THE thirty-fifth annual meeting of the Association was held in the Château Frontenac, Quebec City, May 19th to 22nd. More than three hundred delegates were registered and seventy papers were delivered at the various Section meetings and general sessions. The combined efforts of the local committee on arrangements, under the joint chairmanship of Dr. Vézina, Dr. Martel and the President, Dr. Foley, with the hospitality of Dr. Grégoire and his staff, provided the delegates with a meeting which, in the words of some of the older members, was "the best yet".

On Tuesday afternoon, May 20th, Their Excellencies Lord and Lady Alexander honoured the executive officers of both the Canadian Public Health Association and the State and Provincial Health Authorities of North America by receiving them at a reception in the summer residence, The Citadel.

The Executive Council met on Monday, May 19th, and their deliberations, which were both interesting and constructive, carried on until the late hours of the evening. Amongst the highlights of this meeting was the formation of a committee for the training and certification of statistical clerks. Dr. Neil E. McKinnon has consented to act as chairman of this committee. The committee hope that, following study of the problem, a plan for the training of these personnel can be devised.

Following a discussion of finances, it was agreed that membership in the Association should provide a greater percentage of the revenue required to operate the Association than previously. An increase in fees—from \$3.00 to \$5.00 a year—for membership in the Association was authorized by the Council.

The Report of the Committee on Salaries and Qualifications of Public Health Personnel was accepted by the Council, with the provision that the

study be continued and the report revised at regular intervals. The proposed Reports on the Educational Qualifications of Laboratory Personnel, Medical Officers of Health, and Public Health Engineers were submitted to the Council and approved for preliminary publication. The reports are to be subjected to an eight-month period of open criticism by members of the Association before they are revised and presented to the Council for final approval.

Honorary life membership was presented to Surgeon General Thomas Parran of the United States Public Health Service and to Dr. Walter L. Bierring, President of the Conference of State and Provincial Health Authorities of North America and State Commissioner of Health, Iowa. Both of these outstanding men have for a long period shown a keen interest in public health affairs of an international nature involving Canada and the United States.

Dr. A. J. Phillips presented the first report of the National Committee for School Health Research. This committee is sponsored jointly by our Association and the Canadian Education Association. Copies of the report are being circulated to interested health authorities through the provincial departments of health.

The Executive Council endorsed the policy of the formation of provincial branches of the Canadian Public Health Association in those provinces where organizations do not exist, and the strengthening of the liaison between the Canadian Public Health Association and provincial health associations that are already in existence. The implementing of this policy will be one of the main objectives of the Association for the coming year.

The formation of a new Section of Public Health Administration was approved by the Council. It was the hope of the Council that this new section would gradually encompass the

interest of a large group of public health personnel rather than increase the present number of sections. Its formation would, in the long run, tend to eliminate some of the multiplicity of interests that may disrupt the smooth functioning of annual meetings.

Amongst the distinguished visitors attending the meeting were Dame Katherine Watt, Chief Nursing Officer, Ministry of Health, England; Miss Yvonne Hintsche, Director of Nursing, International Red Cross, Geneva, Switzerland; and Dr. Pierre Lepine of the Pasteur Institute. And, of course, our colleagues from the United States, representing the State and Provincial

Health Authorities of North America, brought with them many eminent speakers whose contributions provided that outside stimulus that is so important to the success of the meeting.

The Association elected Dr. G. F. Amyot of Victoria as President for the year 1947-48. The thirty-sixth annual meeting will be held in Vancouver on May 17-20, 1948.

Our Quebec confrères are to be congratulated on the efficient manner in which such a stimulating meeting was conducted and they are to be thanked for once again providing "Quebec hospitality" in such generous amounts.

J. H. Baillie

BOOKS

Hygiene. By Florence L. Meredith, B.Sc., M.D. 4th ed., 1946. Philadelphia and Toronto: The Blakiston Company. 838 pages. \$11.00.

THERE is much to commend and little to criticize in this fourth edition of *HYGIENE*. The major considerations having to do with health and disease are discussed in a well-arranged, well-balanced form. The factors and means making for healthful living receive particular emphasis, with every part and function of the body included. Since, as indicated in the preface, this book is designed primarily for the guidance of the layman, especially the college student, this is as it should be and the sections dealing with reproduction and mental health may be considered especially valuable. The sane, common-sense, even homely, philosophy in regard to these subjects is very refreshing. The author's expression is simple and direct, often pithy, and general statements are usually made clear by suitable concrete examples, a practice that more writers might well emulate.

It appears obvious that medical undergraduates are not to be included among the college students for whom this text is intended. While they would profit appreciably from a study of its contents, the material and presentation are not sufficiently technical and scientific to give the needed training and qualification for the practice of good hygiene and preventive medicine. Even though not primarily intended for medical students, lack

of mention of what is now called "social medicine" with its concept of man as a member of society and the influence of his occupation, income, social status, security and so forth on health seems a serious omission. A brief co-ordinated treatment of this subject which received only scattered and passing reference would have strengthened and rounded out this volume. Of a more technical nature, the immunization program suggested on page 204 would be considered inadequate for parent guidance by many authorities. Immunization against whooping-cough, for example, is scheduled for 9 months, yet the author elsewhere is at pains to point out that 80 per cent of the deaths from this disease occur under one year of age. A much earlier start for this procedure is not only logical but widely practised.

In general, one is very favourably impressed with *HYGIENE*. It is a readable, thoughtful, brightly-written text suffering from little of the dullness all too common to writings on this subject. One would predict a wide field of usefulness for this text.

F. O. Wishart

Health Insurance in the United States.

By Nathan Sinai, Dr.P.H., Odén W. Anderson, and Melvin L. Dollar. Studies of the New York Academy of Medicine Committee on Medicine and the Changing Order. New York: The Commonwealth Fund, 1946. 115 pp. \$1.50.

THIS is another of the series of studies of the New York Academy of Medicine Committee on Medicine and the Changing Order. It is of the same format and high standards as other books in this series. It presents, in a brief and readable manner, short descriptions of the various hospitalization and medical-care programs that exist in the United States; a very interesting review of the rise and fall of interest and activity in national health insurance in the United States; a fair and, I think, unbiased synopsis of the opinions and attitudes of professional, government and lay groups in the United States who are interested in the hospital and medical care of the people; a discussion of state legislation with regard to enabling acts for voluntary hospitalization and medical-care plans; a concise presentation of the problems that exist in voluntary plans due to the features and characteristics of these plans in relation to the great variations, both geographical and economic, that exist in the different communities in the United States.

To anyone interested in studying the growth of a social movement like health insurance, this book will provide an excellent review, presented in a facile and fair manner. It was obviously written for distribution in the United States, but to Canadians interested in the social and economic factors of medical and hospital care, it will provide many a stimulating argument. If possible, it should be read and studied in conjunction with the other books in this series.

J. H. Baillie

Estimation of the Vitamins. Edited by W. J. Dann and G. Howard Satterfield. New York: The Ronalds Press Company, 1947. 531 pages. \$6.50.

THIS is Volume XII of a series called Biological Symposia. Previous volumes have contained extensive reviews on a variety of subjects. The present volume is a compilation of thirty chapters by different authors, all of whom were apparently selected because they were experts in the respective subjects. The various chapters deal with methods for the determination of vitamins. The preface states that the editing of the volume was largely done by Dr. Dann, whose capabilities are well known in the nutrition field.

Whenever possible, three types of analytical methods have been given: biological, microbiological, and chemical. In each case, generally, a recommended procedure is given. Extensive references to original papers are provided. Criticisms of details could be advanced, as in the case of the description of chemical methods for ascorbic acid in which Roe's procedure is covered in a brief paragraph. Such criticisms are offset by the general value of the volume to persons who are concerned with vitamin estimations. It should be noted that the book is intended for such persons; it would not be recommended except for this purpose. As such it is excellent.

E. W. McHenry

ABSTRACTS

Rickettsialpox—A Newly Recognized Rickettsial Disease

RICKETTSIALPOX is a newly identified but apparently not new disease. The aetiology and transmission seem established by the isolation of rickettsia from the blood of patients and from *Allodermanyssus sanguineus*, ectoparasites of mice. This clinical study of 144 cases occurring in New York City was made by epidemiologists of the New York City Health Department assisted by a representative of the United States Public Health Service.

Briefly, the disease was characterized by the appearance of an initial lesion usually on the covered parts of the body but occasionally on various exposed parts. About a week after the beginning of the initial lesion a febrile illness of acute onset, accompanied by chills,

fever, sweats, backache, headache and lassitude, developed. Three or four days after the onset of fever, a maculopapular and papulovesicular rash appeared. Laboratory examination revealed leukopenia and complement-fixing antibodies for rickettsialpox but was otherwise negative. In differential diagnosis, chickenpox, smallpox, infectious mononucleosis, epidemic and endemic typhus, Rocky Mountain spotted fever and other rickettsial diseases presented the main problems.

None of the cases terminated fatally and usually the patients did not appear acutely ill in spite of the fever and other symptoms. Fever and rash persisted usually from about 4 to 7 days.

M. Greenberg et al.,

J.A.M.A., 1947, 133: 901.

Penicillin Therapy of Scarlet Fever

THE EFFICACY of penicillin in the treatment of scarlet fever is reported in this paper, together with a comparison with the results of antitoxin therapy. In a series of 86 cases, penicillin was found to decrease the toxicity, greatly reduce the occurrence of pyogenic complications, and virtually to eliminate the carrier state. On the basis of this experience, it is recommended that "all patients with scarlet fever be given penicillin intramuscularly in doses of 25,000 units every 3 hours of commercial or crystalline penicillin G or in doses of 50,000 units every 6 hours of penicillin X, or orally in doses of 125,000 units of commercial penicillin G every 3 hours. Severely toxic patients should receive antitoxin in addition. Penicillin therapy should be continued for at least 5 days, or until the patient has recovered from all pyogenic complications."

Antitoxin and penicillin therapy were compared by treating alternate cases. In those who received penicillin, 10 per cent had mild pyogenic complications consisting of mild pharyngitis 2 to 3 weeks after completion of therapy and no further treatment was required. In contrast, 44 per cent of the antitoxin group developed pyogenic complications of which otitis media was the most common. Reappearance of haemolytic streptococci late in the hospital stay was observed in 10 per cent of the penicillin group, whereas 85 per cent of the antitoxin group continued to harbour the organisms for most of their weeks in hospital. Decline of fever was more abrupt with antitoxin than with penicillin but the decrease in toxicity appeared about equal.

A control group of 123 mild cases were treated asymptotically, with a complication rate of 26 per cent and a carrier rate of 82 per cent before discharge from hospital. Since preparation of this paper, a further 50 cases of scarlet fever were treated with 100,000 units of penicillin administered orally every four hours and were free of complications and haemolytic streptococci disappeared during therapy in each instance.

H. L. Hirsh et al.,

J.A.M.A., 1947, 133: 657.

The Treatment of Serum Sickness with Benadryl

THIS REPORT concerns the use of Benadryl in 10 children who developed serum sickness following the administration of either rela-

tively crude or highly refined horse or rabbit antisera. Case histories for the 10 children are presented. Complete control of the serum sickness was obtained in 9 cases and marked improvement in the 10th. Doses of Benadryl of 50 to 100 mg. given at 6- to 8-hour intervals and continued for the usual duration of the illness were required. The action of the drug appeared to be suppressive only and its too early withdrawal resulted in a return of the illness. A dose of 100 mg. completely abolished all signs of serum sickness within 2 to 3 hours and the effect seemed to last for 6 to 12 hours. Children tolerated large doses, up to 8 mg. per pound of body weight, well. The powder was found less productive of nausea than the elixir.

J. Cyril Peterson and L. K. Bishop,

J.A.M.A., 1947, 133: 1277

Exudative Tonsillitis and Pharyngitis of Unknown Cause

THIS REPORT concerns a study among army recruits of 54 cases of exudative tonsillitis and pharyngitis due to beta haemolytic streptococci and 125 cases in which no specific organism could be identified and which were presumably of nonbacterial origin. This latter type of case appears to have a relation or association with epidemics of undifferentiated acute respiratory disease and may represent a variant of this condition.

Clinically, a differentiation between the beta streptococci and nonbacterial types can usually be made. The former has a more acute onset, manifests more systemic reaction, the inflammation and exudate of the throat and pharynx are more extensive and severe, and there is much less tendency to involvement of the lower respiratory tract. The leucocyte count is usually moderately elevated in the streptococcal disease and normal or only slightly elevated in the nonbacterial form. In spite of these differences, the individual variation in the cases makes bacteriological and serological examination essential for accurate diagnosis. Repeated throat cultures for the presence of beta haemolytic streptococci and blood examinations for antibodies to this organism establish the type of infection. Since the nonstreptococcal disease is benign and free of recognized complications while the streptococcal form may result in serious and crippling sequelae, establishment of accurate diagnosis is the only basis for appli-

cation of rational therapy. While the incidence of the two conditions in civilian life is not known, both undoubtedly occur and are probably often treated without a knowledge of or regard for the aetiology.

Commission on Acute Respiratory Diseases,
Fort Bragg, N.C.,

J.A.M.A., 1947, 133: 588.

To prevent extensive, expensive epidemics, early diagnosis, adequate facilities for treatment including X-ray therapy, and use of the Wood light for detecting cases and determining cures, are essential.

R. J. Steves and F. W. Lynch,

J.A.M.A., 1947, 133: 306.

Ringworm of the Scalp

PRIMARILY this article deals with an epidemic of ringworm of the scalp in Minneapolis, St. Paul and surrounding communities. Of equal interest, however, is the fact that other epidemics have occurred widely throughout the United States to the extent of creating an important public health problem. Thus epidemics have appeared in at least 61 other cities. The aetiology of ringworm is reviewed and the important differences between animal and human types of fungi noted. The former is self-limited, does not tend to become epidemic and responds to topical therapy, while the latter occurs in epidemic form and is resistant to local treatment other than X-ray epilation. Differential diagnosis is based on clinical examination including use of the Wood light and laboratory examination, particularly culture of the organism.

In Minneapolis and St. Paul and district, ringworm of the scalp was rare prior to 1943, whereas in 1945 and 1946 there were 747 cases. In St. Paul, all of 584 cases were due to *M. audouini*, the "human" type of fungus. Of the remaining cases, 80 per cent were due to this organism. Boys were infected nine times more frequently than girls. Cases due to animal types of fungi were fairly readily cured with topical applications, but for *M. audouini* infections X-ray epilation was much superior and appeared essential for handling the epidemic form.

Investigation of the spread of infection was made. School contacts did not appear to be a major factor. Intimate home contact accounted for an appreciable number of cases. The high incidence in boys suggested the barbershop as a likely source, and while 80 per cent of the boys attended public barbershops, infection was not definitely traced to this source in any case. Suspicion is directed to theatres, with the deposit of infected hairs on the back of theatre seats suggesting a likely mode of transmission.

Tuberculosis Case-Finding

THE great volume of chest X-rays taken by different methods in the many mass surveys now being conducted led to this intensive study of the efficiency of the different technics. The different technics consisted of 35 mm. photo fluorogram, a 4 by 10 inch stereofluorogram, a 14 by 17 inch paper negative and a 14 by 17 inch celluloid film all taken within a few minutes of each other on each of 1,256 persons. Five expert interpreters read each set of films independently and later made a second independent reading of the 14 by 17 inch celluloid films.

The results appear surprising. There were great differences in interpretation between the five readers, and indeed between the interpretations of the same films on two different occasions by the same reader. Problems arising out of under-reading and over-reading became apparent. The former is more serious as no further check is then obtained, but the latter, while leading to further study, does harm by creating anxieties. When these serious discrepancies of individual interpretation were reviewed on a basis of "group opinion", the picture became much brighter. The efficiency of the different techniques was seen to be very equal and of the order of 90 to 95 per cent.

Out of this study come recommendations: (1) that in mass survey work all films be read independently by at least two interpreters and that any film called positive or suggestive for tuberculosis be a basis for further investigation; (2) that the problem of interindividual and intraindividual variation in film interpretation be subjected to thorough investigation; (3) that a revision of the method of classifying X-rays is needed and should be based on extensive study and actual experimentation.

Carl C. Birkelo, M.D., et al.,

J.A.M.A., 1947, 133: 359.

